AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

Vol. XLII
Number 19

PUBLISHED WEEKLY AT 239 WEST 39th STREET
NEW YORK, MAY 6, 1920

Thirty-five cents a copy
Three dollars a year

GENERAL LIBRARY
MAY 13 1920
UNIV. OF MICH.

CHAMPION TRADE MARK

Champion Dependable Spark Plugs

Champion Conical A-43
Price $1.00

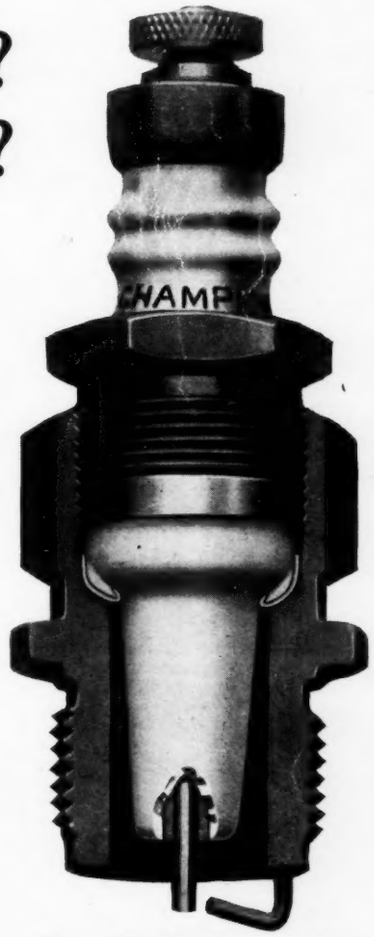
Which Shall It Be? Conical or Petticoat?

THERE is a real difference. Why not let the Engineers of the Champion Spark Plug Company work with you to decide the question of type?

We can show you a real Safety Factor in Petticoat Plugs as well as in the Conical type.

Champion Spark Plug Company
Toledo, Ohio

Champion Spark Plug Company, of Canada, Limited, Windsor, Ontario



Champion Petticoat A-44
Price $1.00

Entered as second-class matter June 8, 1903, at the post office at New York, N. Y., under the Act of March 3, 1879.

The United Markets of America

Win Them by the Zone System of Advertising and Merchandising

Advice that thinkers in every age have heartily agreed upon is applied to the problems of modern business by "The Zone System of Advertising and Merchandising."

You remember the ancient Greek fable of the old man who told his son to break a bundle of sticks—how the powerful muscles of the son knotted in vain endeavor—and how the feeble father then broke the sticks one at a time.

In place of a bundle of sticks, consider forty-eight sovereign commonwealths which constitute the American Union—some of them containing cities equal in population to European nations. **Think not of the United States, but of the United Markets of America.**

The problem of the manufacturer is to "break into" these United Markets. The sane, economical way to do this is to "break up" the tremendous mass of 110,000,000 people scattered over the continent into logical units for sales and advertising work, as illustrated by the above map, and then "break into" each market separately.

The International Harvester Company, for instance, has divided the United States into 91 sales zones. There is a branch house in each of these zones, with a complete staff including an advertising department and every facility for working the territory intensively.

Sounds simple and obvious, doesn't it? Yet many a manufacturer has smashed himself in a futile attempt to conquer the United Markets of America with one blow. It is almost universal practice to divide the country into zones for sales work, but advertising has largely been handled as a thing apart by "specialists." Many of these old-time advertising men have seen their work merely as a matter of writing and placing copy. The new and better thought on this subject was well expressed by John Sullivan, Secretary-Treasurer of the Association of National Advertisers, when he wrote:

> *"Advertising per se does not pay. Finding the market and knowing the market, and then co-ordinating sales and advertising does."*

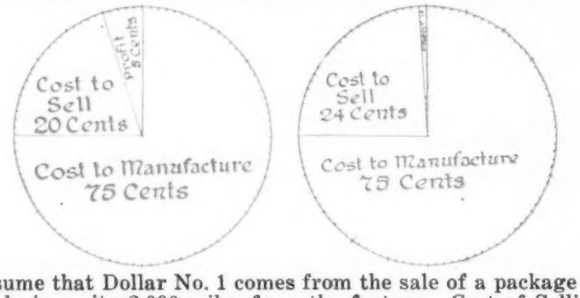
Link Sales and Advertising

Advertising is only one of many factors in the process of merchandising or distribution. A large proportion of the waste charged against advertising is the result of considering it as a thing apart. If advertising is not linked with selling in a broad, well planned scheme of merchandising, it must involve waste, even though it win an apparent success.

The primary function of advertising in the merchandising of a product is to assist in selling it. It is to assist the manufacturer in selling it to the retailer (sometimes through jobbers) and to assist the retailer in selling it to the consumer.

Not only must advertising be an assistant to selling, but it must be designed to promote selling **at a profit.** Every business man knows that not all sales are profitable; but many advertising men ignore this vital fact. A sale is a sale to them and the advertising is credited with a triumph even though accountants record the net in red ink.

Each dollar that a manufacturer received on a given day from the sale of his product may be divided into Cost of Production, Cost of Selling, and Profit. That part of the dollar coming within the first two classifications must be paid out for rent, interest, wages, transportation, materials, etc. Only the last of these (Profit) remains with him. Cost of Production will often be the same for every dollar, but Cost of Selling will vary greatly. Profit will vary with the Cost of Selling.



Assume that Dollar No. 1 comes from the sale of a package of candy in a city 2,000 miles from the factory. Cost of Selling has almost eliminated Profit. Dollar No. 2 comes from the sale of a package of candy in the city of manufacture. Cost of production remains the same, but owing to the smaller Cost of Selling the all-important division Profit is five times as great—a gain of 400%.

When the manufacturer analyzes all the dollars that come in to him to discover how each one ranks in Cost of Selling and Profit, he may find that there are big, desirable markets from which his dollars come with unusually large slices of profit, but from which he receives very few dollars.

Dodge Drone Dollars

He may learn that a considerable proportion of his advertising appropriation is being expended in securing the unprofitable drone dollars from remote sections.

It is then time for the manufacturer to get his selling and advertising campaigns co-ordinated for the production of high-profit dollars. In other words, it is time to localize and sectionalize the advertising, putting it squarely behind the sales work.

Intensive sales and advertising campaigns should first be organized in those sections where receptive markets, convenient transportation, possibilities of large volume, etc., indicate that each dollar of sales work will yield maximum profit. Advertising and merchandising effort should be concentrated in these sections until they are producing all the high-profit dollars that can be obtained from them. Then, the next best sections should be taken up in the same way until every market which can be worked profitably is yielding its full quota.

It is sometimes assumed that the Zone System of Advertising and Merchandising is only for the small concern. But as noted above, it is the corner-stone of the great structure of the International Harvester Company. It is the method by which the small concern may grow with greatest rapidity and with least danger.

The manufacturer who builds his business in this sane, sure manner may never be able to boast of "National" Distribution. His New England made heating plants may be unknown in California, or his California marmalade may have no sale in Florida. His vanity may not be tickled—but the solidity of his business and the size of his bank balance will console him.

"THE CHICAGO TRIBUNE DOMINATES THE CHICAGO TERRITORY"

THIS IS A PAGE FROM THE CHICAGO TRIBUNE'S 1920 BOOK OF FACTS, WHICH WILL BE SENT FREE ON REQUEST TO ANY SELLING ORGANIZATION IF REQUESTED ON BUSINESS STATIONERY.

AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

VOL. XLII NEW YORK—THURSDAY, MAY 6, 1920 No. 19

National Business Meeting Develops Automotive Problems

Production increase, considered from many industrial angles, was the basic note of last week's meeting of the Chamber of Commerce of the United States at Atlantic City. This article interprets the discussions and recommendations as they apply to the automotive field, briefing the discussions

By Clyde Jennings

IT was a distinct disappointment to the members of the automotive industry attending the Eighth Annual Meeting of the Chamber of Commerce of the United States at Atlantic City last week that the highways resolution prepared after the vote of the group meeting in favor of national control of highways did not come before the general body. This resolution, with several others, including the recommendation on federal taxes, was not reported upon because the resolutions committee did not have time to consider properly all of the data submitted by the numerous group sessions. A recommendation will be made later on this subject.

Otherwise, the victory of the automotive industry was complete. It was accorded a place on the general session program on Wednesday morning, when George M. Graham, general sales manager of the Pierce-Arrow Motor Car Co., presented the case of the motor truck as a transportation unit. He was accorded a position and time on the program equal to that accorded the steam and electric railroad and the merchant marine. And right well he took advantage of the opportunity offered. His reception by the general body was all that could be asked by the industry.

It was also interesting that the motor truck was the dominating interest at the group session on Highways on Wednesday afternoon. Every suggestion as to road making or road control was based upon increasing the use of the truck and the necessity of planning for the future use of this vehicle for the hauling of short haul freight. Several of the speakers put the radial distance of truck operations as high as 125 miles.

But there was a jar at this meeting which put the automotive men present in a fighting mood. A paper prepared by Thomas H. MacDonald, director of the Bureau of Public Roads, directly opposed the national control of road planning and construction. It spoke plainly for the view that roads were a local utility and each community should have the privilege of arranging and building its own roads. This paper was regarded by those present as a statement of the view of the present National Administration toward this subject and an announcement that the adminis-

tration forces would oppose the Townsend Bill, hearings upon which will begin next week in Washington.

The automotive industry representatives, joined by many other road men present, at once accepted this challenge and waited patiently as the afternoon session dragged into twilight to bring about a vote on the resolution brought to the meeting by a representative from Arizona, which was outspoken in favor of national control. This resolution was adopted without a dissenting vote and went to the general resolutions committee as the unanimous voice of the group meeting. Alfred Reeves, general manager of the National Automobile Chamber of Commerce; Pyke Johnson, in charge of the Washington office for that organization; Roy Chapin, president of the Hudson Motor Car Co.; Roy Johnson, vice-president of the White Motor Co., and other representatives of the industry, were much gratified by the victory, but they sense the danger lurking in the suggestion that the Administration may oppose the Townsend bill. They regard the incident as a call upon the entire industry to lend its effort to promotion of a highways scheme which will permit the use of automotive vehicles in interstate transport.

If there is to be local control, it will mean a limitation of the best use of these vehicles to local road systems because the communities are not likely to agree upon the direction of development and the entire road system will be disjointed. And further, where there is a community that has not been sufficiently interested in education to learn of the great economic and social advantages of good roads, this community would be closed to the tourist because of the missing link of roads.

The program of the group session linked nicely with the address made by Graham at the general session. There was not a single assertion that reflected upon the motor truck or the passenger car as a useful means of transportation within limits. In a number of cases, the speakers not taken from the industry were inclined to give a larger sphere of economical action to the vehicles than the industry has claimed for its own.

Col. Brainerd Taylor, chief of the Army Motor Transport Corps, was the first speaker of the afternoon, his subject being, "The War's Development of Motor Transport." The industry is rather familiar with most of the facts he developed, but his plea for the army as a peacetime institution, where men can be taught discipline and can acquire a thorough education in such practical lines as truck service and driving, attracted much attention. He told of the recent action in Cleveland, where many manufacturers are pledged to encourage one per cent of their working forces to join the army each year. This was to be done by pledging to the man who goes into the army his job when he comes back, with a wage increase based upon his increased efficiency. Colonel Taylor's presentation of this phase of the work was directed squarely to the automotive industry on behalf of the Motor Transport Corps. He presented this branch of the peace army as an automotive school with great possibilities. The program of the Highways group session was;

Chairman: F. A. Seiberling, president, Goodyear Tire & Rubber Co., Akron, and chairman Committee on Highways, Chamber of Commerce of the United States.

Secretary: Vernon E. Blagbrough, field secretary.

1. The War's Development of Motor Transportation.
   Col. B. Taylor, chief Motor Transport Corps, U. S. A., Department of the East, Governors Island, N. Y.
   Windsor T. White, president, The White Co., Cleveland. (Read by Alfred Reeves, general manager of the N. A. C. C.)
2. The Country's Highway Program.
   (a) Federal Government's Part.
   Thomas H. MacDonald, director, Bureau of Public Roads, Department of Agriculture, Washington, D. C.
   Roy D. Chapin, president, Hudson Motor Car Co., Detroit.
   (b) The State's Part.
   W. A. Alsdorf, Ohio Good Roads Federation, Columbus.
   A. G. Batchelder, executive chairman, American Automobile Association, Washington, D. C.
3. Motor Transportation.
   (a) The Farmer.
   Luke W. Duffey, chairman, Good Roads Committee, Indianapolis Chamber of Commerce, Indianapolis.
   (b) The Manufacturer.
   W. J. L. Benham, general traffic manager, Otis Elevator Co., New York.
   (c) The Consumer.
   W. F. Knowles, Division of Extension, New Jersey State Agricultural College, New Brunswick, N. J.

A report of the session of the Chamber of Commerce as a whole must be an enthusiastic approval of the idea that developed into a meeting on the subject of production. At no time did the meeting depart from this topic and the ideas and views presented took form in rather direct channels. There was little of the shotgun idea of hunting without aiming at something and depending on a heavy load to kill the game somewhere in the general region of the point aimed at. Briefly, the substance of the meeting might be summed up as follows:

First—Put your own business in order;
Second—See that laws are properly revised by your own active participation in elections, voting only for legislators who take a reasonable view of business and tax laws;
Third—Put into your practices the economy of all materials that you can;
Fourth—Be careful that you do not lend your influence to the promotion of unnecessary financing or production.

The carrying out of the ideas given publicity at this meeting of probably 3000 men of affairs is entirely another matter. No doubt every man there who did not have his own particular hatchet to grind was impressed by the earnestness and directness of the meeting. The man who had an axe to grind likely was comforted by the same thought, for the men gathered there were in a mood for grinding axes but they were not in the mood for sharpening smaller tools.

But to get back to the subject of production resulting from this Production Session of the greatest business body this country has ever seen. If the men who were present wait for the Chamber of Commerce of the United States, through its directors and executive staff, to carry these ideas into effect, production will fall as flat as has the production of aircraft since the war demand has passed. But, if the 3000 men who foregathered by the sea and so successfully withstood the attractions of the luxurious hotels and rubber-tired wheel-chairs to attend the sessions, will each go home and carry out individually as many of the suggestions offered as he can, there will be a notable boost in production within the next half year.

The situation, it must be clear to all persons who attended, is one for individual practice to grow into a mass practice. It cannot be handled by waiting for the mass action.

This cannot be better illustrated than by a review of the political ideas that ran through all the general sessions. Taxes were a big subject. Probably, they were the biggest subject introduced into the session, for not only was one session devoted almost entirely to the subject, but it had an outcropping almost wherever a group gathered. George T. Buckingham, a Chicago lawyer and one of the impressive speakers on this subject, made the flat declaration that he was going to vote only for legislators who took a reasonable view of taxes and money

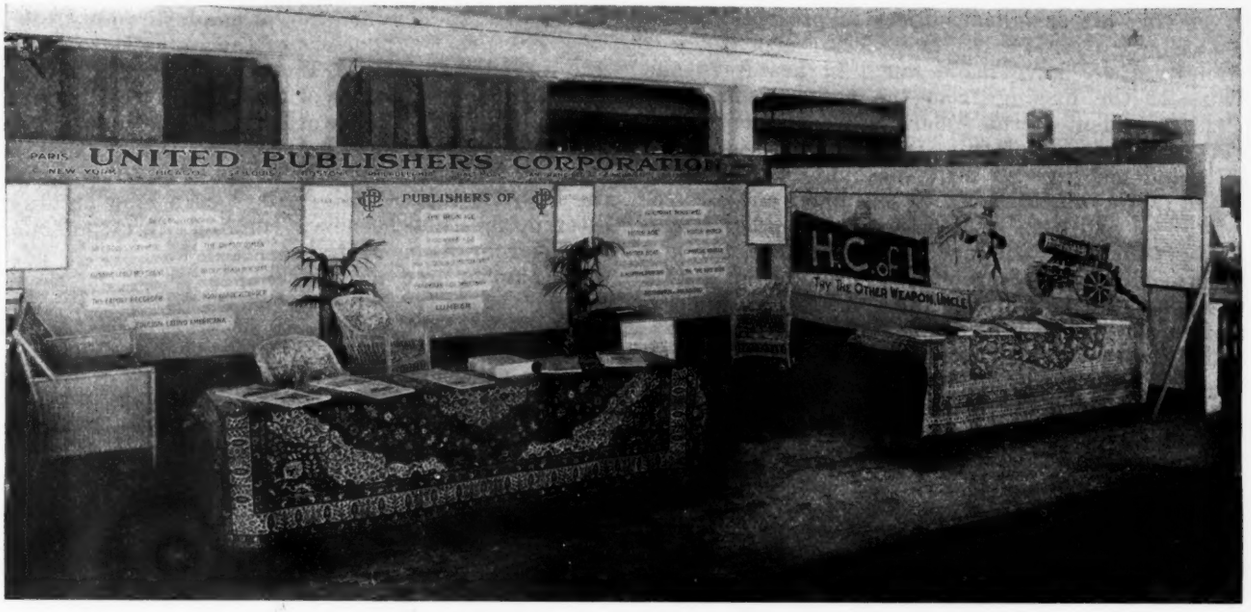


Exhibit of the United Publishers Corp., which includes the Class Journal Co., at the eighth annual meeting of the Chamber of Commerce of the United States at Atlantic City

expenditures and who refused to be coerced by political threats. He gained loud and extended applause by this assertion. But it is obvious that Mr. Buckingham's calm consideration and direct action in this regard is going to have little effect unless he is joined by other men who take this same view. There were enough men and women applauding this sentiment to swing several congressional districts. But it will take direct action to realize upon the resolution. Voting is never a case for mass resolution, for the voting box is private and only individual action counts.

The subject of taxes was apparently well cleared up at the Tuesday night session. Every view was presented except that the present federal tax laws are a good thing for business. No person was present to defend the present status. Daniel C. Roper, recent Commissioner of Internal Revenue, was a speaker and he applauded the American public, both individuals and firms, who had worked so hard to find out what their taxes were and then paid them without a murmur. After this tribute, he took issue with some opponents of surtaxes, income and excess profit taxes by stating that these taxes were likely more sinned against than sinful, in that these taxes alone were not the sole cause of the high cost of living, or of the high profits of manufacturing. He admitted defects in the present system of taxation, but he thought the most serious objection was that these laws had driven so much productive ability to thinking and planning means of escaping taxation. He closed with a sly dig at certain means of escaping taxes by making extraordinary expenditures for good-will advertising and promotion, by asserting that he could not convince himself that good-will promotion built on money belonging to someone else would be good promotion.

The opinion of the Chamber on taxes would be interesting, but the resolution on this subject was one of those that was not submitted because the committee had not had time to complete it. The opinion might easily be drawn that those present strongly favored the one per cent tax on gross sales, if one was to judge the temper of the audience by the applause given to certain projects. Only the sales per cent idea was heartily applauded.

But taxes were only a part of the production subjects that reverted back to Washington. There was the idea of reasonable railroad rates. Objections were not made to freight rates as they now stand. The recently enacted Transportation Act was praised by some speakers but their remarks were greeted with silence. Apparently the greater number of those present are ready to admit that they do not know the details of how to right the transportation difficulties, but there was no doubt that all present wanted them righted.

It was openly stated that certain industries were limited in their production by the number of freight cars at their disposal. This statement has often been made with regard to the status of highway building, but the report there was of a broader nature and its reception made it plain that the big men of business believed what was said.

George A. Post, spokesman for the railroads, said, in explanation of the present condition of transportation, that there was no denial the railroads were not properly prepared for the great increase of production that has taken place within the last five years; that there had been no preparation for the future while the roads were in the hands of the Government; that the owners of the railroads were unable to know their position as to the acceptance of the roads and how the roads would be given back to them until after the enactment of the Transportation Act, and that when they did know they placed orders for equipment and learned that the market for materials had been engaged for months in advance.

As a result, he said, the railroads needed 4000 locomotives and 200,000 freight cars and under present conditions they had no chance of getting these for several months. He added that there had been no passenger cars built for four years.

The electric railroads did not get a very sympathetic hearing, although John H. Pardee made a strong case on the subject of interurban and intra-city needs. But when he dropped the passenger end to get into short-haul freight problems, he appeared to lose his grip.

It was here that George M. Graham took the floor on behalf of the motor truck for L.C.L. freight within distances of less than 100 miles. He was accorded an excellent hearing. Once or twice Graham diverted sufficiently to present the case of the passenger car as a utility, but he did not make the mistake that some other speakers

did of leaving his assigned subject to present another issue.

The newspapers have made much in headlines and otherwise of the hissing from the stage of Matthew Woll, vice-president of the American Federation of Labor. A news account of this incident, unless of great length, could not give an exact account of what happened and it is a difficult story to tell under any circumstances. Woll had been invited to tell of "Labor in Relation to Production." He made a very good speech and was accorded a hearty reception. He brought out a good deal of applause, even while giving voice to certain criticisms of employers. A type of his statements follows:

"In the matter of management, the war has demonstrated very clearly the importance of proper and efficient labor management and direction. Heretofore we have cared too little about manpower. We have been more concerned with the safeguarding of machinery and tools, leaving the individual to care as best he could for himself. And so, business to-day is keen that in its business activities it employs the most efficient management possible, spares no expense, hesitates at nothing when that efficient management may be obtained. And so, we find business to-day also keen in securing efficient management in its mechanical departments to care for its tools, to care for its machines and equipment, and it has been only recently that there has been developing a realization of the need of efficient labor management in order that the same degree of care may be exercised in the care of labor and the efficient management of labor.

The Labor Engineer

"As you hold the engineer when generating power fails, to find the cause and remove the cause and again start generation at work, so likewise with labor there is need for the engineer of labor so that when labor power fails there may be the engineer charged with the duty of determining the cause and making the adjustment in order that production may again go on. We feel that in this labor management proposal there are, of course, two ways of approaching the subject, one from a purely academical viewpoint, by putting in the engineer who has only book knowledge, and the other by putting in the practical engineer, the man who understands men, the man who understands the needs of men, the man who has had experience and knows the conditions of labor, and is, therefore, better qualified to meet those problems. When we are ill we employ a doctor, and so when we have legal difficulties, we employ a lawyer. Let us follow the same standard of judgment when we have labor difficulties. When we have labor troubles let us secure a man trained and efficient in labor subjects, and do not let us invade any other field and bring on maladjustments and further destruction and friction (applause).

"So we agree with you in the matter of management. We urge proper management of labor, as we know that the greatest amount of difficulty that arises in our industrial field is due to improper labor management and the failure to understand, and too often ignorance, on the part of the real owners of industry, because of faults and improper information given them."

But when Woll had finished with his speech he did not quit. He already had exceeded his time. Then he took up other matters and began to argue on them. His audience got restless but he talked on and on. Once, after an attack on the "amusing Kansas Industrial Court," he apologized for trespassing on time and said he would close soon. This statement brought a reception that an actor would call an encore. Apparently Woll so regarded it and he continued, growing a bit stronger in his denunciation of employers until he began to suggest that supporters of the Industrial Court were like in vision to Lenine, Trotsky and Debs. It was then that the hisses and cries of time came but Woll persisted and said perhaps 300 words more that no one off the platform could hear. It would be a mistake to infer that the treatment of Woll reflected any feeling toward the body he represented. His speech long before these interruptions had become a running fire of personalities at Governor Allen of Kansas, who also was a guest of the Chamber and an added speaker to the then prolonged session.

The Kansas Industrial Court

When Governor Allen did get a chance to present the plan of the Kansas Industrial Court, he neatly disposed of Woll by saying to the audience: "My friend, the representative of the American Federation of Labor, who concluded his remarks by referring to the Kansas effort as an amusing thing, really did not make in your minds, I believe, the impression that amusement was the emotion which characterized his emotion at the time." Then Governor Allen explained the workings of this new court, which shall be the subject of a separate article.

Between Woll and Governor Allen, John W. O'Leary spoke on the employer's part. He disputed, with definite references, some statements made by Woll but the feature of his address was his assumption that employers everywhere were accepting as a legitimate aid to production the education, moral and financial promotion of their employees and the meeting of their employees in fair discussion as to hours and working conditions.

In all probability, the best remembered session of the Chamber will be that of Wednesday night, when Sir Auckland Geddes, Ambassador from Great Britain, was the chief speaker. This entire session might be termed a "spiritual" session, as compared with the practical sessions. The Ambassador did not attempt to talk production as the man interested in the making of things to-day, but he graphically sketched the condition of Continental Europe, in a way to bring tears to many eyes. Then he told of England having undertaken its part of the burden, as shown by the selling of bunker coal to the ships touching at English ports at a price below that of the open market. He told the business men before him that he was prepared to submit to them a perfectly logical statement as to why they could not profitably undertake business with Continental Europe to-day. He was not going to submit this statement, but was going to ask that they undertake such business as a step in humanity and for the future of the world. We might print the Ambassador's talk—it was not a speech—but it would seem weak as compared with the impression that 3000 or more persons carried out of the great hall on Young's pier that night. That talk needed the personality to "make it go over," which it did.

The Commerce Building at Washington

Following the Ambassador, Harry Wheeler, the Chicago banker, made the report on the project to erect a Chamber of Commerce building in Washington. This project is now financed to more than $2,500,000, including endowment. It was not a mere lobby enterprise, he said, nor was it exactly a laboratory for business, but it was a contribution on the part of business to the education of the Government and national public of the high aims of business in this country. It was to serve as a reminder of the Government that business has dignity, earnestness of purpose. The building, he said, would be of a character to give this impression. Wheeler's presentation of his subject fitted nicely into the spirit left on

the meeting by the Ambassador and, in closing, Wheeler asked permission to reread something that he had presented to the last annual meeting of the Chamber of Commerce at St. Louis.

"A fair return on capital actually invested is every man's due," he said. "Anything more should be invested in the business to reduce costs and lighten the high cost of living. If capital insists upon taking an abnormal profit, then most certainly labor is entitled to ask an abnormal wage and the public must suffer.

"Business men should apply the principles of fair dealing to which they subscribe to their own business, and if they do not live up to the doctrine of fair play they must assume a part of the responsibility for the grave condition arising from soaring prices.

"We are not discharging our obligation fully when we try to sell our goods for all the traffic may be expected to bear."

Then the meeting was given a quick turn by E. T. Meredith, Secretary of Agriculture, who indicted the "doubtful patriots who always criticize the government." The Secretary introduced himself as the "salesman for the department," and he proceeded to tell of the stock in trade in this department in a manner that was replete with humor and sarcasm. His especial plea was that all business is based upon the prosperity of agriculture and that most of the progress in agriculture in these days is made through the Federal Department. He said that the farming industry comprised a capital of $80,000,000,000 and, to promote this, many critics begrudged the department a $12,000,000 annual appropriation. Last year, he said, $50,000,000 worth of long staple cotton had been grown in Arizona from seed developed by this department. Then he added in rapid succession the losses saved by hog cholera serum, cattle tick treatment, boll weevil antidotes and other helpful developments. The unusual form of the address probably presented a lot of business facts to the business men present in a way that will gain for the department a serious second thought.

The resolutions adopted by the last session of the Chamber are unsatisfactory, as so many subjects were ignored because the committee did not have the opportunity to properly consider them. Twenty-seven resolutions on as many topics were handed to the committee, which had only a few hours to consider them. The voice of the Chamber on most of these topics will be heard later. Probably the most interest attaches to the comment on soldier bonus. The Chamber opposed a straight cash bonus but favors all occupational aid that can be given. Other resolutions favored a curbing of extravagance, a plea for the enactment of a treaty of peace, legislation for the promotion of the merchant marine and inland waterways, a development of the fire prevention work, measures to increase the paper output and the sustaining of the pivotal industries that were so greatly increased during and for the war. The resolution on railroads reads in part:

"The services required by agriculture, industry and commerce clearly exceed the capacity of the equipment and facilities of our railroads. Rehabilitation of railroads is of predominant importance in the period of readjustment. Toward this rehabilitation the legislative step has now been taken by Congress. Realization of the advantages to be obtained from legislation now primarily depend upon administrative authorities of the Government and the attitude of the public which is to be served. Each member of the community is urged to consider the value to him of adequate and efficient railroad transportation.

"The Interstate Commerce Commission and all other public authority participating in administrative responsibility are urged to proceed expeditiously with their function in order that the remedial results of the new legislation may quickly become apparent, railroad credit restored in the manner necessary for the general welfare and improvement of the railroads and additions of their equipment at once placed in course. Until the supply of railroad transportation approximates the demand every possible economy in use should be practiced through fuller loading of cars and promptness in loading and unloading."

A consideration of this meeting would be incomplete without a brief further reference to the recognition of the business press as a vital factor in business. The only exhibits permitted in connection with the convention were those of the business publications. A number of New York publishers arranged such exhibits but the Philadelphia and Chicago papers made only a general exhibit from each city.

In the session of the Business Paper Group, presided over by H. M. Swetland of the United Publishers Corp., there were some excellent lessons brought out, some of which have been presented through this publication. The business paper group probably covered as wide a range of topics as any group. One suggestion made for production propaganda was made by Roy V. Wright, managing editor of *Railway Age*, who said that reports indicated that since the signing of the armistice, the loading of freight cars had lessened two tons to each car from the high standard attained through the wartime patriotic urge.

High Speed at High Altitude

A RECORD average speed of 155 m.p.h. has been maintained by a Breguet airplane equipped with a Renault 300 hp. engine and the Rateau supercharger, in a flight from Paris to Lyons, according to advices from Paris under date of April 14. The distance was covered in 1 hr. 50 min. The high speed is attributed to the fact that Lieutenant Roget, the pilot, flew at an altitude varying between 17,000 and 20,000 ft.

At sea level, the speed of this machine is only 93 m.p.h., so that by going to the higher altitude a gain of more than 60 m.p.h on the average speed was obtained. At this height, it was not necessary for the pilot and his mechanician to use oxygen masks and, with the use of the Rateau turbine compressor, there was no falling off in the engine power. It would appear that the wind did not assist in attaining the increased speed for, on the day of the flight, the weather bureau reported that the direction was from south to north, or against the machine, with an average velocity of between 16 and 19 ft. per second.

This experiment appears to justify the prediction of Breguet that with air tight cabins and the use of the Rateau compressor it would be possible to attain an altitude of 50,000 ft. and fly at a speed of 250 m.p.h.

Annual Gear Meeting Marks Progress in Standardization Work

A varied and interesting program was offered at the Fourth Annual Meeting of the American Gear Manufacturers Association, which was held at Detroit last week. Of principal value, as seen by Mr. Heldt, was the trend toward standardization, which was considered exhaustively.

By P. M. Heldt

DETROIT, May 1.

THE Fourth Annual Meeting of the American Gear Manufacturers Association, which came to an end here at the Statler to-day, was one of the best meetings ever held by the Association, both as regards attendance and the variety and interest of the program offered. The Association is still growing, and from the report of the Membership Committee it appeared that there are now eighty-six member companies, most of them represented by both executives and associates. One new company was elected to membership at the meeting—the Durston Gear Corp. of Syracuse, N. Y.

The convention was opened on Thursday morning, April 29, by President Sinram with an address entitled "Another Year of Association Endeavor." President Sinram pointed out that Detroit was a fitting place for holding the Gear Manufacturers' meeting, not only on account of its convenient location and attractiveness, but also because it received a larger portion of the products of American gear manufacturers than any other city in the world. He said he liked the people of Detroit, that they included many men of vision who had made the city known throughout the world.

Reviewing briefly the history of the Association, the President said that its foundation was secure and that work on the superstructure had been started. One phase of their endeavor was sectional meetings held in different cities, including Pittsburgh, Cleveland, Philadelphia, Chicago and Boston, of the local gear makers. These meetings were the direct outcome of association in the national organization.

Fair Dealing

Gear making, the President said, was a high-class business. The A. G. M. A. stood for equity, fair dealing and an honest product, and it was now recognized by the engineering world. Membership was an asset of increasing value.

During the past year a definite start had been made in standardization. In pursuing this work, the Association must build steadily and firmly. The question was sometimes asked whether it was not possible to employ an engineer to evolve the standards. This was entirely out of the question. The membership of the Association had the necessary experience and knowledge, and collectively was better able to do the work than any individual could do it. Additional talent was coming in as the Association grew. Subcommittees of the Standards Committee should include all those properly qualified to take part in the particular work in hand. If anybody was not properly placed in the standards organization, he should make it known, and if he knew of anybody who could be of help in this work he should so notify the officials. The subcommittees should be neither unwieldy nor too limited in scope of knowledge and experience.

Two papers were also read during the morning session, one by D. G. Stanbrough, general superintendent of the Packard Motor Car Co., on "Gears from the Purchaser's Standpoint," and the other by J. A. Urquhart of the Brown & Sharpe Mfg. Co., on "Routing of Gears and Machine Parts Through the Factory." Mr. Urquhart's paper was accompanied by a number of forms which are used in applying the system described. We expect to print both of these papers in forthcoming issues of AUTOMOTIVE INDUSTRIES.

Membership Report

During the rest of the forenoon an official address of welcome was made by a representative of Mayor Couzens of Detroit, and reports of various committees were received. In connection with a report of the membership committee, doubt was expressed as to the wisdom of admitting to membership companies whose gear business constituted only a very small percentage of their whole business.

The afternoon was spent in a visit to the Ford Motor Co.'s plant in Highland Park. Most of the time was spent in the gear department, where all information requested was given by the superintendent of the department. The visiting members remarked especially upon the speed at which various operations were performed, some of them stating that the work turned out by the men seemed to be from twice to three times that which they obtained at their own plants.

At the opening of the Standards Committee Meeting on Friday, Richard J. Durley, representative of the Canadian Engineering Standards Committee, made a few remarks in which he urged co-operation between his committee and the American Gear Manufacturers Standards Committee. C. F. Crofoot, chairman of the commercial standardization committee, made a report in which he presented to the committee a revised edition of the standard contract form adopted by the Association at its Boston meeting. At Boston, several changes were made in the wording of the form, and this was the first time the printed form was presented as finally adopted. A vote was taken reaffirming the adoption of the form, and Chairman Crofoot urged all members to put the form into use at once. He also said that he wanted to hear from members regarding any further work they might do, and was asked

to list and standardize the trademarks and symbols which gear manufacturers stamp on their product. The committee was also asked to standardize a form for the purchase of material.

The Standards Work

B. F. Waterman made a report for the General Standardization Committee. He referred to the organization of the American Engineering Standards Committee and said that the A. G. M. A. would appoint a committee which would co-operate with the American Society of Mechanical Engineers, the former representing gear manufacturers and the latter gear purchasers.

During the past year standards had been adopted covering composition gearing, a complete chart having been made out on this subject. Standardization of bevel gearing was also entered upon and certain recommended practices adopted. The subject of gears and pinions for electric railways and mines was also considered, this work having been put through in co-operation with the Electric Street Railway Association. It was the intention of the A. G. M. A. to issue an official book on gears, which should contain all essential information on the subject of gear cutting. This, he thought, would add to the prestige of the association.

W. H. Diefendorf said he wanted to drive home to the members the need for backing up the work of the subcommittees and dwelt at some length upon the necessity for standardization.

A. C. Gleason, chairman of the Bevel and Spiral Bevel Gear Committee, made a report dealing with the subject of long and short addendums for generated gear teeth. The long addendum tooth was introduced some years ago in order to obviate undercutting in pinions with a small number of teeth. It has been customary in the past to make the addendum of the pinion 0.7 times the total effective tooth height, and the addendum of the wheel 0.3 of the effective tooth height. Mr. Gleason said that the practice of using the fractions 0.7 and 0.3 was not entirely logical, and he presented tables of maximum practical addendums for bevel gears, based on a back cone radius of 1 in. on the pinion. This table had four vertical columns, corresponding to 14½ deg. straight, 20 deg. straight, 14½ deg. spiral, and 20 deg. spiral gears, respectively, and 8 horizontal lines, corresponding to gear ratios of 1 to 1 to 8 to 1, respectively. For any back cone radius other than one inch, the figures in the table would be multiplied by the back cone radius. Mr. Gleason said he had tried to work up a rule that was convenient for use in the gear business, even if gears were cut in small lots. He said that the fraction 0.7 generally used was too much on the safe side in some combinations. It is intended to further elaborate the tables, including teeth of 30 deg. spiral angle, and the standard circular thickness for both gear and pinion will also be included. These tooth thicknesses will also be given for a one inch back cone radius, and for any other back cone radius, will have to be multiplied by the value of this radius.

Roller Chains

E. R. Weiss, chairman of the Sprocket Committee, made a lengthy report covering dimensions of roller chains, notes on design, relative positions of wheels, how to figure roller chain drives, horsepowers for roller chains, working loads for roller chains, table of approximate speed ratios, maximum wheel bores, diameters for single width wheels and general dimensions of wheels. These data were taken from the Link Belt Data Book No. 257. Mr. Weiss said that a standard tooth form had been under consideration for quite a time and that there had been much talk but no action. The S. A. E. had been trying to adopt additional sizes of roller chains to conform to the English standards, and a sprocket form to take both English and American chains. Under the heading of general dimensions of wheels in the sprocket committee report, forms and dimensions of rims and spokes were given. Henry Eberhart remarked that arms and rims should be the same for all kinds of gearing, whether spur, bevel, worm or sprocket. In the discussion it was brought out that the efficiency of the chain drive was as high as 98 per cent and that the horsepowers given in the horsepower table referred to the input.

There was some discussion on the standards for composition gearing adopted at a previous meeting. George L. Markland said he had found the side plates too light. It was suggested that these plates should be ⅛ in. heavier than the standard adopted, and that if they were formed with hubs extending into the bore of the composition material, so that the two ends would come together within ¼ in., the service of the gear could be greatly increased. John B. Foote said that his concern had been making gears of this description right along and that it was entirely a matter of cost. The standard for composition gearing did not include this construction, the committee considering it special.

Herringbone Gears

A. F. Cooke, chairman of the Herringbone Gear Committee, made a report offering for adoption standards for one class of herringbone gears. Mr. Cooke said that in adopting standards for this type of gearing, it was necessary to make two divisions of the subject, one covering herringbone gears of right and left hand sections generated simultaneously in a solid blank, and one for gears in which the right and left hand sections are cut in separate operations on solid or separate blanks. This division, he said, was made necessary by the entirely different methods used in cutting the two types of gear. The recommendations made concerned herringbone gears in which both right and left hand teeth are generated simultaneously. They included the use of diametral pitch hobs up to and including 1¼ diametral pitch, a spiral angle (of teeth with axis) of 22½ deg., a pressure angle (on the axial section of the hob) of 20 deg., of an addendum equal to 0.8 divided by the diametral pitch, a dedendum equal to 1 divided by the diametral pitch, a pitch diameter equal to the number of teeth divided by the diametral pitch, a minimum width of face equal to 6 times the circular pitch and a width and depth of groove in the center of the blank dependent upon the diametral pitch. It was further recommended that the pitch diameter of pinions with 25 or less teeth be increased and the pitch diameter of the gears correspondingly decreased to eliminate the undercut of the pinion. Dimensions for this increase and decrease in pitch diameter were given in a table. The teeth of the two sets are to be in line and not staggered. Dimensions of all the tooth elements and of the grooves between the two sets of teeth were given in tables of the report.

In the discussion some objection was raised to the fact that the proposed standard covered only herringbone gears made in a single piece, but Mr. Cooke explained that it was the intention to equally cover the other type of gear, only that it was considered advantageous to keep the two standards separate for the sake of simplicity.

In this connection the question of single thread versus multi-thread hobs was brought up. Frank Burgess claimed that greater accuracy could be obtained with a single thread hob, and the difficulty of getting a hob ought to be considered in fixing the standard. The multi-thread hob gave greater production, but accuracy was very important. Mr. Burgess also said that he preferred a single helical gear to the herringbone type. Of course, with the single

helical gear end thrust had to be contended with, but this could be kept down. In evolving standards, practicability should always be considered.

W. H. Diefendorf pointed out that the report did not propose to recommend the use of double helical over helical gears.

In reference to the question of single versus multiple hobs, Glenn Muffly stated that for accuracy it was best to use either a single hob or else a double hob with an odd number of teeth. He would rate the different methods with respect to accuracy as follows: 1, single-thread hobs; 2, multi-thread hobs with the number of threads in the hob primed with respect to the number of threads in the wheel; 3, multi-thread hobs with the number of teeth in the wheel divisible by the number of threads in the hob. Mr. Muffly also pointed out that both the pinion and gear should be cut with the same hob. George L. Markland suggested that any standard herringbone gear should be a single piece, on account of the chances of error if it was in two pieces. Chester C. Hamilton, Jr., thought that the recommendation was too specific altogether and that recommendations should be made for a standard that was applicable all the way around. Frank Burgess said that he favored very small grooves, ⅛ or ¼ in., and a gear made in two parts riveted together, on account of the lower cost.

Methods of Hobbing

Mr. Miller, representing the Fellows Gear Shaper Co., said that the groove in a herringbone gear was dependent upon the method of hobbing and that the pressure angle was dependent upon the helix angle. It was suggested in the report to enlarge the pitch diameter of the pinion, but he would suggest to make the pressure angle such that no enlargement of the pitch diameter was necessary. The effect of increasing the pitch diameter was to increase the pressure angle and the action of the teeth would be modified thereby. Mr. Cooke replied that the suggestions made in the report had been demonstrated in actual use. One objection was raised to the proposed standardization of the helix angle, namely, that if the gear should be made in small widths, it would be impossible to get continuous action except with a comparatively large helix angle.

A very extensive report on proposed standards for worm gearing was made by J. C. O'Brien, chairman of the Subcommittee on Worm Gears, Worms and Spirals. Mr. O'Brien developed a nomenclature for worm and spiral gearing, and gave rules for the calculation of the different elements. He said that his report referred particularly to the general industrial range of worm gearing, from ¼ in. to 2 in. axial circular pitch. Axial circular pitches of ¼, ⅜, ½, ⅝, ¾, ⅞, 1¼, 1½, 1¾ and 2 in. were proposed. A conventional sketch of a worm gear was shown on which proposed symbols for the different quantities were marked in. The following formula was proposed to show the relation between the circular pitch and the pitch diameter of the worm:

$$\text{Pitch diameter} = 2.4 \text{ c. p.} + 1.1 \text{ in.}$$

Similar formulæ were given for many other factors entering into worm gear design, showing that the author of the report had given great thought to the subject, and he was paid a compliment by the president of the Association.

Steel Standards

Mr. Hamilton suggested that in the formulæ abbreviations should be used instead of symbols, so that each formula would be self-explanatory without reference to a key. Mr. O'Brien stated that his formulæ and proposals were based upon data of a large number of hobs in the possession of members of the Association. Mr. Hamilton said that some of the hobs referred to were thirty years old and the average age of the hobs was probably fifteen years, and he questioned the wisdom of basing standards for future practice upon data as old as that. Some of the helix angles suggested were rather flat and he thought that steeper angles would be better as they were more efficient.

R. L. Dodge, chairman of the Hardening and Heat Treating Committee, made a report for that committee. He said that before the subject of hardening and heat treating could be approached, they had to standardize the materials to be used, and he submitted a list of fifteen steels which he thought would cover all requirements in the gear industry. These were numbered 1 to 15. Most of these steels correspond closely to one or another of the S. A. E. steels, except for variations in the chromium, manganese, sulphur and phosphorus contents. In the discussion, considerable opposition developed to the proposed abandonment of the S. A. E. steel specifications and designations. A letter had been received by the committee from the Warner Gear Co. in which the proposal was deprecated, and it was suggested to take the matter up with the S. A. E. Standards Committee, Steel Division. Henry Eberhart said he liked the report very much and suggested that a remark be added to each number, stating the purpose for which the steel was to be used. It was pointed out that the rather high phosphorus and sulphur limits in the present S. A. E. steel specifications were adopted during the war as an emergency measure and that the limits would undoubtedly be reduced in the near future. The S. A. E., it was said, was open to suggestions on this score.

Inspections

E. J. Frost, chairman of the Inspection Committee, made a report on methods of inspection. He said there were thirty-six subjects that could properly be taken up by this committee, and that the best plan of procedure would be to take up a few of the subjects at a time. One of the subjects to which attention had been given was that of inspection of holes. All types of gears would be considered. It had previously been agreed to divide all gears into three classes, according to the degree of precision required, viz., 1, aircraft and printing press gearing; 2, automobile gearing; 3, pump and general industrial gearing. For the inspection of holes it would be recommended to use "go" and "not go" gages. The plug gages should be made less than the minimum size of the hole by an amount which would be different for the different classes of tolerances. Tolerances would have to be set for allowable wear before a plug gage would have to be discarded. For the maximum allowable eccentricity of master gears under 6 in., pitch diameter, a limit of 0.001 in. was recommended. Mr. Diefendorf asked whether any attention had been given to the subject of conical pins for inspecting bevel gears and said that the subject was very illuminating. These pins, he said, were made by the Bilgram Machine Works. He also suggested that the subcommittee obtain drawings of different testing fixtures for testing spur and bevel gears as used by the members.

Friday evening the Association held an informal banquet at the Statler, President F. W. Sinram acting as toastmaster. The speakers of the evening included Edmund Vance Cooke and Henry M. Leland, president of the Lincoln Motor Co.

At a meeting of the Executive Commitee held at the close of the convention, May 1, the present officers were reelected. The incumbents are as follows: President, F. W. Sinram; vice-president, H. E. Eberhardt, and secretary-treasurer, Frank D. Hamlin. At the banquet held on April 30, President Sinram was presented with a handsome watch, with knife charm and association emblem.

Studies of the Control and Seating Arrangements of Tractors

In the evolution of the gasoline tractor, many points of design have yet to be carefully studied and worked out to promote the best interests of the industry. This article is important in the series of design studies this publication is presenting to the tractor builders for their consideration.

By P. M. Heldt

COMFORT of the driver and ease in handling are points upon which salesmen will enlarge more in the future when tractors have reached more nearly a common level as regards operating cost and reliability. At present the farmer seems to be intent mainly upon getting a machine that will do the work—that he can depend upon—and loses sight of any little features that are calculated to enhance his comfort while performing his work. In automobile design, the arrangement of the control devices has now been almost completely standardized. Considerations of safety have made such standardization almost imperative, as there would be grave danger of accident if a driver accustomed to one car changed over to another make with a different arrangement of the control devices and then happened to get into a traffic jam.

In tractor design no such considerations apply, because the tractor is a low-speed vehicle and the possibility of accident due to wrong manipulation of the controls is remote. However, it is certainly desirable that the controls be so arranged that they can be reached and operated by the driver from his seat without going into contortions. The seat should be comfortable to sit upon and should be so located that the operator can accurately steer the tractor without continually craning his neck.

The Driver's Comfort

Many of the requirements looking toward comfort for the driver seem to be hard to meet, because the tractor is given the same severe treatment as agricultural machinery. That is, it is left out in the open in rain and shine, and all its parts must be really weather-proof. It is for this reason that most tractor designers stick tenaciously to the cast or pressed steel agricultural seat, although a man riding on an unsprung vehicle ten hours or more a day would seem to be entitled to a cushioned seat provided with back rest. Some of the makers of creeper type tractors have met the demand for comfort by providing a wagon type of seat with a cushion upon it which can be removed when the tractor is left out. It is obvious that these seats are a great improvement over the agricultural seat. The creeper type of tractor, moreover, needs a cushioned seat particularly, as it is subject to very severe vibration when moving over hard and rough ground. Perhaps a tipping seat with cushion and back, which could be tipped over, so as to protect the cushion from moisture while not in use, would meet the requirements.

In steering wheels ordinary rough cast-iron wheels are commonly used, because it has been found that the truck type of steering handwheel, glued up of wood segments, swells and splits when left out in the open and does not give a sufficiently long service. It would seem that hard rubber or Bakelite coverings on a metal core should be a great improvement over the present type of wheel. Possibly they are too expensive for tractor work. One thing that has to be taken into consideration is that, with about half a dozen exceptions, tractor models are not manufactured in very large numbers and, in view of this and the facts that the tractor is still more or less in its infancy and changes in design occur at close intervals, it does not pay to invest too much in manufacturing equipment.

The Cost Problem

In refinements of the seat, of its mounting and also in the design of the steering wheel, the question of cost enters to some extent and all suggested improvements have to be submitted to the test of commercial practicability. This question, however, does not enter into the design of lever and pedals for convenience in operation. The levers should be of such length that the effort required to operate them is well within the strength of the average operator and the range of their motion should be such that the handles can be conveniently reached from the seat in both extreme positions. The same applies to the pedals.

A lock for the brake pedal or lever may not be essential, as on a tractor the brake is only rarely used, but there are occasions when the possibility of setting the brake is quite a boon. Some attention should also be paid to the matter of foot rests. In this respect, the old-style tractors with a platform at the rear have the advantage over the backbone or frameless type with the seat extending to the rear of the tractor and a pair of foot rests on the axle tubes. This latter arrangement affords the driver little chance to vary the position of his legs as long as he remains in his seat.

At the Kansas City show last February, an AUTOMOTIVE INDUSTRIES artist sketched the control and seating arrangements on nearly a score of tractors and these sketches are published herewith.

Description of the Tractors

The Uncle Sam tractor has a pressed steel seat with a high back and a loose cushion on the seat. The wheel steering is arranged at a rather rakish angle in the center of the tractor and the gearshift lever works on a quadrant cast integral with the steering post supporting bracket. The clutch lever is located on the left, for operation by the left hand. Individual brakes are fitted

to the rear wheels and the pedals for same project through the wheel houses. The throttle control lever is also mounted on the wheel house, on the left-hand side.

A rather uncommon arrangement of the control devices and an unusual design of seat are used on the Tioga, a new tractor model which made its first appearance at the Kansas City show. There is a pressed steel bench for the seat, which rests on four coiled springs and has a cushion strapped to it. The steering post is located to the right side of the center and is fitted with an automobile type of steering wheel. Spark and throttle control levers are mounted on the steering post below the wheel. A foot brake is fitted, the pedal for which is located directly in front of the seat, centrally over the drum. Of the two rear levers, the one on the left is for the two forward speeds while the one on the right is for the reverse. The forward lever on the left is for the clutch. The feature of the control is the shortness and lightness of the levers as compared with those on other tractors. Corrugated steel footboards are provided. The ignition switch, an oil gage and a choker are mounted on the dashboard. As indicated in the sketch, the seat can be swung to one side to afford entrance. The seat is provided with a back rest.

A Swinging Seat

On the Dart, an agricultural type of seat is provided, on a "C" spring on a swinging bracket, which latter is held in its normal position by means of a pin passing through a slot in the base hub. On this tractor a disk type of brake is provided, which is mounted on the end of the worm shaft and is applied by means of the left hand, but operation of this brake lever is not very convenient, as it is rather too close to the steering wheel. The steering mechanism is of the motor truck type and is mounted to the right of the center. Spark and throttle control levers are on top of the steering wheel. The gear shifting lever is forward of the steering post and arranged about parallel with it. There is a special clutch for the power take-off, which is controlled by a fore and aft sliding rod, provided with an upwardly extending handle on its rear end. The magneto switch is located adjacent to the power take-off control member on a cross member of the frame. The clutch is controlled by a pedal with the left foot.

An agricultural type of seat is used on the Triumph tractor. While not so fitted on the model at the Kansas City show, it was the intention to make the seat adjustable so that it could be swung out of the way to allow the driver to stand on the platform. A Lavine truck type of steering gear with 20 in. wood rim hand wheel is fitted, and the spark and throttle control levers are mounted below the wheel. This tractor is one of those making use of individual brakes on the rear wheels and the pedals for these brakes are very close together, directly in front of the seat. The gear shift lever is mounted centrally and has a fore and aft sliding and a transverse rocking motion. The clutch lever is located on the right-hand side and it was the intention to provide it with a lock for locking it in the out position. Such a lock is said to be very convenient if a man wants to adjust the plow. The ignition switch and the pull rod for the changeover are mounted on the dash.

An Unusual Arrangement

A rather unusual arrangement of the control devices may be seen on the Kardell, which is due to the fact that this tractor is designed to be provided with control extensions for operation from the implement. An agricultural type of seat is supported by a flat spring extending rearwards from the housing. This tractor, it may be pointed out, is of the backbone or frameless type. There is no steering post on this tractor, but instead there is a vertical bracket fitted with a yoke near its top from which there extends backward a supporting structure for the steering wheel and control levers, this structure being adapted to swing horizontally around the pivot axis of the yoke and is also capable of a limited up and down motion, owing to the pivot joint to the yoke and a double spring cushion support. It will be readily understood that such a flexible connection of the supporting members with the tractor is necessary if the tractor is to be controlled from the implement drawn, as in turning corners there will be a considerable angular motion of the tractor with respect to the implement and in passing over hummocks and gullies there will be a corresponding angular motion in a vertical plane. While the seat is mounted centrally on the tractor, the steering wheel and all the control parts are somewhat to one side. The lever on the left side controls the brakes, while that on the right side operates the gear changes, which are obtained by means of individual clutches. The small lever on the right is for the throttle. A flexible wire extends from this lever to the throttle lever, thus making possible the swinging motion of the control support. The ignition switch is mounted centrally behind the steering wheel and its lever moves on a horizontal axis.

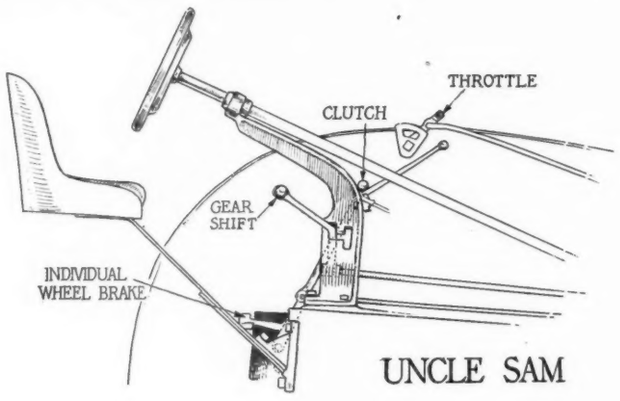
On the Shelby, which is of the all enclosed type, an agricultural style of seat is mounted on an "S" spring. The steering gear has a wood-rimmed type of wheel and is mounted to the right of the center. Spark and throttle control levers are mounted on the steering post and move in vertical planes. This tractor, too, has individual rear wheel brakes, and the brake levers, which are hand levers, are located just inside the wheel houses on opposite sides. The gear shifting lever operates on a quadrant mounted on the dash, which is rather unusual. It has a fore and aft sliding and a transverse rocking motion, the steering gear being of the selective type. The clutch lever is operated by the left hand. The small hand wheel on the dash serves to change over from gasoline to kerosene. The lever seen behind the right fender serves to shift the point of the hitch.

Eight Coiled Springs Under Seat

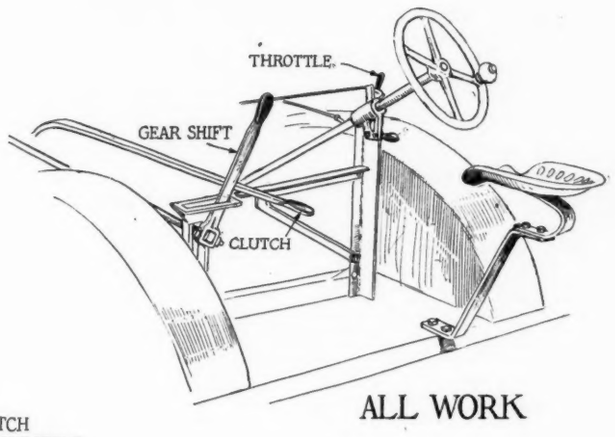
On the new Franklin tractor, which is of the chain track type, an agricultural seat is supported on eight coiled springs, of a special make already described in AUTOMOTIVE INDUSTRIES. The steering wheel is mounted on a vertical post, directly in front and in the center of the machine. It acts on brakes on the differential shafts. The gear shifting lever is forward of the steering post on the transmission housing cover and is bent over to one side so that it can readily be operated by the right hand. The clutch is controlled by a pedal, mounted directly on the clutch yoke shaft on the left side of the gear box. Throttle control is by a pedal on the forward end of the transmission housing and ignition and lighting systems are mounted on the dash.

The control arrangement on the All-Work is of a somewhat primitive design. In this tractor the engine is mounted transversely on the frame and carries the clutch and belt pulley on an extension of the crankshaft. The clutch is operated by a long lever, moving in a horizontal plane, which extends all the way from clutch shaft to within reach of the driver's seat. The gear change is controlled by means of a lever having a transverse motion, which is operated by the driver's left hand, and steering is by a hand wheel on a strongly inclined shaft which passes through a bearing bracket at the top of an angle iron column. The steering wheel

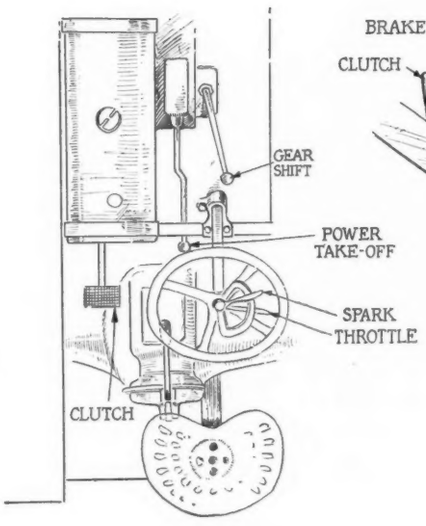
An Analysis of Tractor Seats and Controls



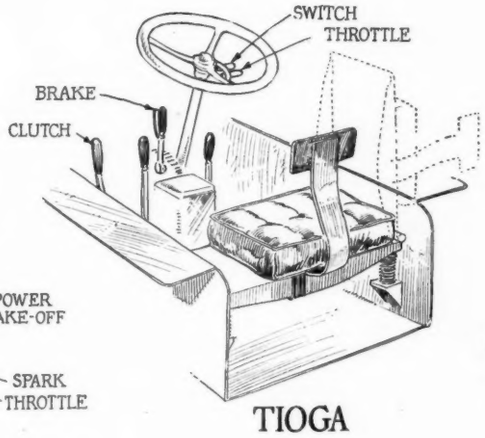
UNCLE SAM



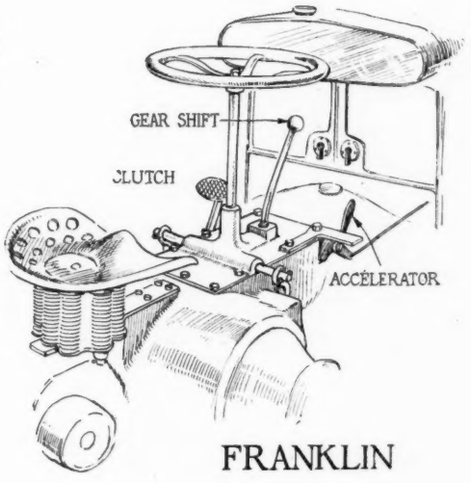
ALL WORK



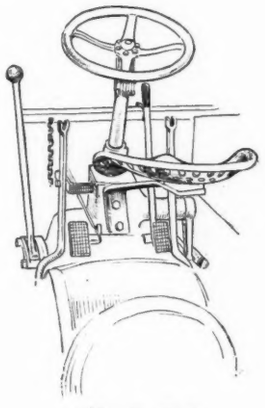
DART



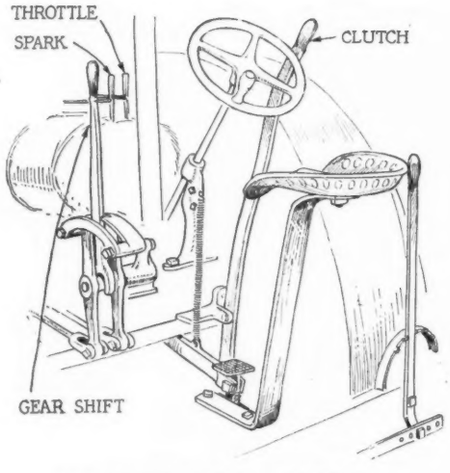
TIOGA



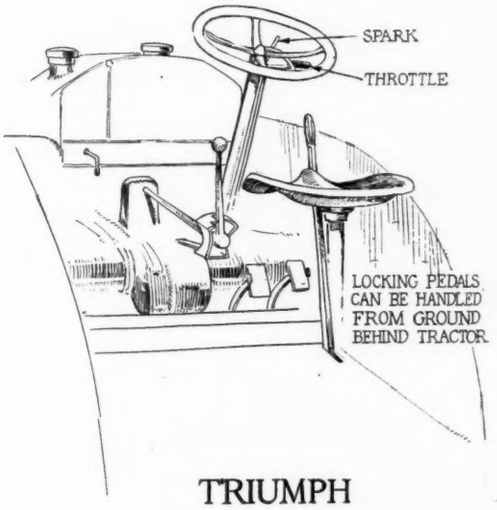
FRANKLIN



W-S-M

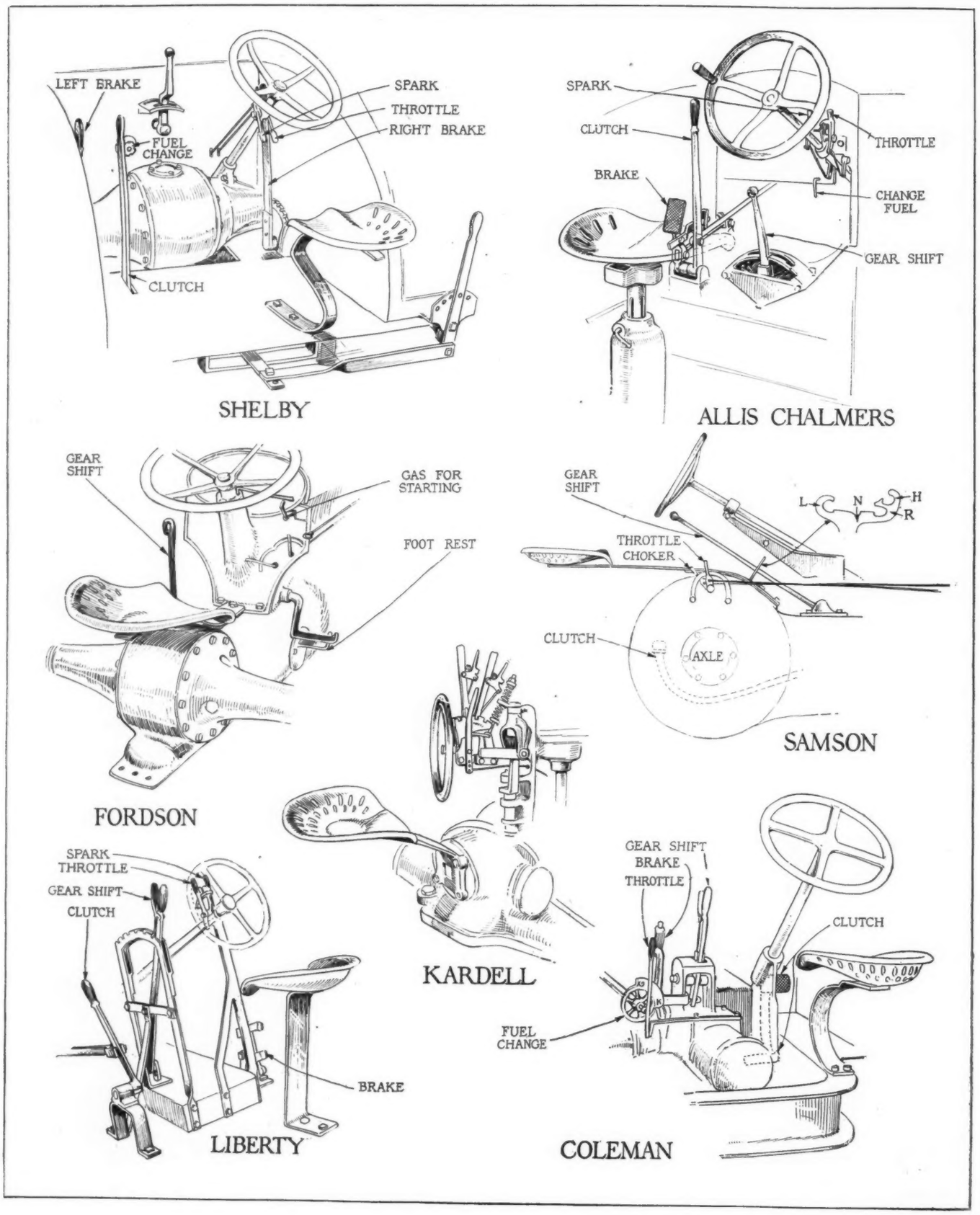


WATERLOO BOY



TRIUMPH

Tractor Practice Sketched for Study



is provided with a knob on its rim so that it can be readily manipulated by one hand. Spark and throttle control levers are mounted on the angle iron column. The seat is of the regulation agricultural type and is supported by a "C" spring fastened to a rearwardly inclined flat steel post which is secured to the rear cross member of the frame. A pull rod with looped end, supported on the right wheel housing, controls the magneto. There is no separate control device for the brakes, the clutch lever also serving the function of a brake lever.

On the Coleman, which is the only tractor having a single step reduction from the engine crankshaft to the rear driving wheels, an agricultural type seat is mounted on a "C" spring on the right-hand frame side member. The seat is free to turn on the spring so as to make it easy to get in and out. The steering column also is way over to the right, so that the driver is in an unusually convenient position for observing the furrow. Up to this year the Coleman was provided with only a single forward speed, but now it is provided with two forward speeds and the change gear lever is mounted centrally directly over the transmission. A pedal on the right side of the steering post serves to control the clutch, while a lever to the left of the gear change serves to apply the brakes. Another hand lever still farther to the left controls the throttle, and a hand wheel directly in front of this lever serves for changing over from kerosene to gasoline and vice versa. The clutch pedal already referred to is of the double acting type, being provided with two pads; that is, the clutch is positively engaged and also positively disengaged.

An agricultural type of seat of rather liberal dimensions is fitted on the Allis-Chalmers tractor. The spring is supported from a cast pedestal and is so arranged that it can be turned into various positions. The pedestal is practically in the center plane of the tractor. Steering is by a wheel with cast rim provided with a handle. The steering post, which is rather strongly inclined, is located over to the right. The flat cover of the wooden tool box forms a footboard. An upright lever on the left of the steering post, having a fore and aft rocking motion, serves for controlling the clutch, and another lever to the right of same, having a rocking motion in the transverse plane, operates the change gears. Directly to the left of the clutch lever is located the brake handle. This handle is provided with a ratchet locking device and the brake can be set in all positions. Throttle and spark levers are mounted on the steering post bracket. Projecting from the center of the dash is a small hand lever which serves for turning on the water feed. A pull rod extending through the dash enables the driver to change from gasoline to kerosene.

On the Waterloo Boy, the control devices are rather compactly arranged. Steering is by a wheel with handle on the rim, the steering column being supported at about mid height by a bracket rising from the frame. Gear shifting is effected by a vertical lever at the left, while the clutch is controlled by a pedal directly in front of the seat. The spark and throttle control levers are mounted on engine, which is of the horizontal type.

A rather unusual arrangement of the steering and control devices is found on the Samson, which is a tractor of the frameless type. The seat is the conventional one, but it is supported at the end of a fairly long flat spring, extending almost horizontally to the rear from the axle housing, which is reinforced by a second spring at its inner or forward end. The steering post, which is quite rakish, is surmounted by the usual type of hand wheel and is supported not far from the wheel by a bearing on a cast bracket. The gear changes are effected by means of a long lever extending substantially parallel to and underneath the steering post, this lever moving on an unusual design of quadrant, as shown in the illustration. A single pedal serves both for withdrawing the clutch and applying the brake. This is of unusual length and extends underneath the rear axle housing. There are two small levers for the throttle and the choker mounted on the rear axle case. The ignition switch is located on the steering post bracket.

The feature of the Fordson control arrangement is the dash plate which forms a rear support for the oval section fuel tank and also has the steering column cast integral with it. Most of the control devices are mounted on this dash plate. The driver sits directly over the gear housing at the center of the rear axle, and foot rests are bolted to opposite sides of the transmission housing. Attention may be called to the fact that there is no unnecessary weight in the control devices.

Little need be said about the Liberty control arrangement except that it is a good representative of the old style of design which makes use of strap iron to the greatest possible extent. There are two features worthy of note in the control arrangement of the W-S-M tractor, one being that the individual rear wheel brakes can be operated either by hand or by foot, and the other that these brakes can be set in position by means of lengths of chain which depend from a cross bar supported by the frame.

Automotive Exports to Italy

BRITISH trade reports state that a demand has arisen in Italy for a low-powered car of comparatively cheap price and are urging the English makers to place such a machine on that market. It would meet with little competition from the Italian makers who were said to be turning out principally a larger and higher-priced machine.

Italy has had an embargo on the importation of automobiles, but, according to reports received by the Bureau of Foreign and Domestic Commerce at New York, the restriction was lifted several months ago to allow the purchase of foreign-made chassis, completed cars still being banned, however. One American exporting house has sold several chassis in Italy within the last few months, but others have reported difficulties in getting their shipments through, and some doubt yet exists in this country as to the exact situation in that country.

The Italian tariff laws, it is understood in New York, are being revised and the probabilities are expressed that they will move upward within a short time. The Italian exchange also has been more or less chaotic, the lire selling down in New York to unexpected low levels. Payments for goods into Italy, consequently, have been difficult and officials of the Bureau of Commerce at New York advised that any credits with Italian firms should be arranged on an American basis, because of the difficult exchange and financial conditions.

German Car Incorporates Unusual Technical Features

Activities of the German automobile builder are always a source of interest to American designers. This brief article, written at Berlin, indicates a few of the things Benz has developed for present production. This is one of the few such descriptions yet received in the United States.

THE Benz Works at Mannheim, Germany, manufacturers of the Benz cars, build a small machine of 20 hp. that has some noticeable technical features. The crankshaft sprocket A, Fig. 1, has a silent chain drive to the camshaft, and this in turn operates the magneto drive shaft C by another chain. For adjusting the timing the tool kit of each car carries templates of sheet steel, ground to suitable shape. Template D is put in so that its timing marks 1, 2 coincide with the marks 1, 2 on the teeth of the chain wheels A and B1. In these positions, the sprocket wheels are fixed until the chain is in place. In the same way, the template E is used to fix the magneto drive wheel C and the camshaft wheel B2.

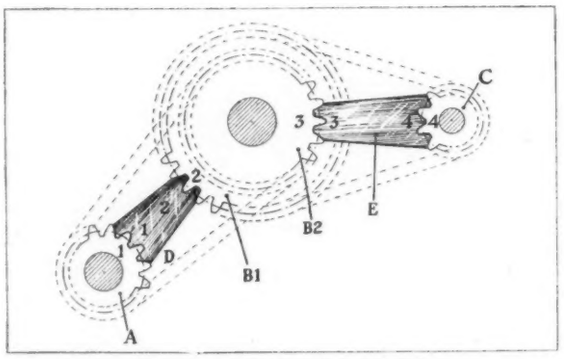


Fig. 1—Benz timing patterns

The oil level in the crankcase can easily be determined by means of the simple try-cock of Fig 2. The two-way cock has two L's of different lengths, which correspond to the maximum and minimum oil levels, and which are closed by a single cover plate bent up of sheet steel and secured to a vertical rod as shown. The top end of this rod has secured to it a pointer which swings over a dial plate marked "Full," "Empty" and "Closed." If the pointer is turned to "Empty" and oil then does not flow abundantly from the short L tube, oil should be poured in until it flows out of the long L when the pointer is at "Full." Finally, the cock is shut off by turning until the pointer stands at "Closed."

The clutch brake has the simple form represented in Fig. 3. To the clutch shaft is fastened a brake disk which in declutching is pressed against the brake shoes, lined with leather. The distance between the brake disk and the shoes can be adjusted by means of nuts on the upper horizontal rod as indicated.

Fig 4 shows a section and perspective view of the wheel puller furnished with each Benz car. For removing a rear wheel, the hub cap and axle nut are taken off, and the threaded piece A is screwed on in place of the hub cap. By turning the bolt B, the wheel is readily removed.

In Fig. 5 is shown the method of fastening the undershield to the chassis frame. An oval wire sling is suspended from an eyebolt in the frame and passes through a hole in a small bent lever, on one side of which is a projecting boss. This boss engages into a hook riveted to the undershield, in the manner indicated. By pressing down the outer ends of the lever, the

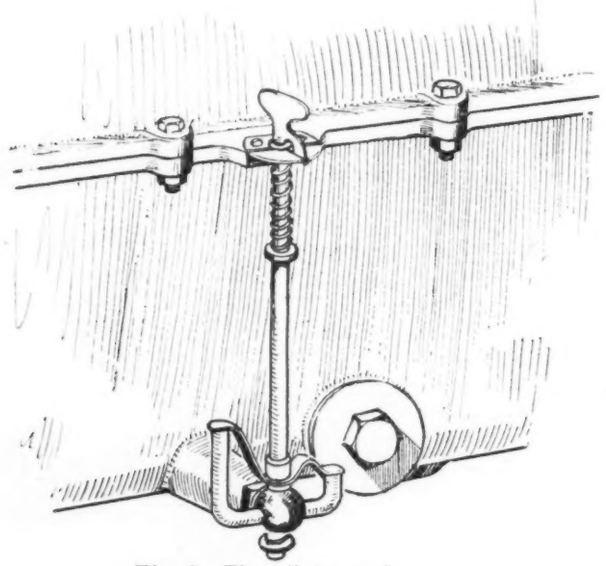


Fig. 2—The oil try-cock

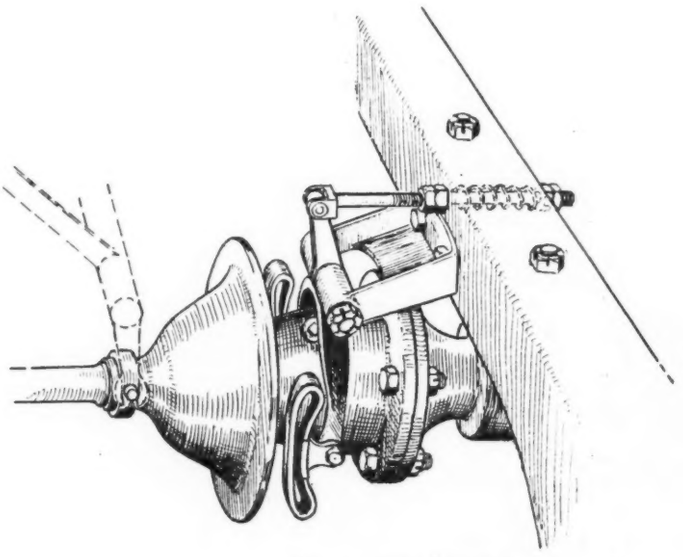


Fig 3—Benz clutch brake

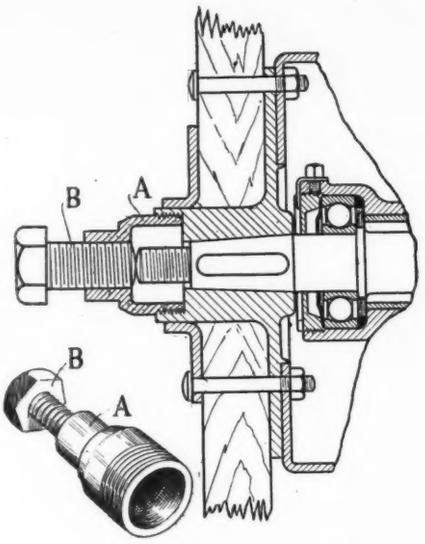


Fig. 4—Benz wheel puller

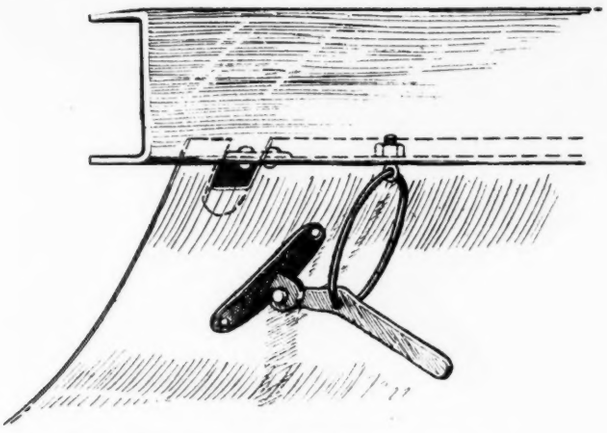


Fig. 5—Undershield fastening on the Benz

undershield is held against the shield hooks on the frame. This method of fastening is cheap, readily operated, noiseless, and holds the undershield firmly in position.

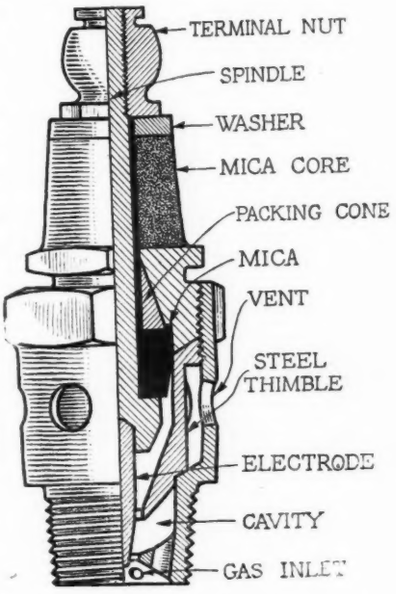
A Self-Cleaning Spark Plug

THE sectional drawing shown in connection with this description makes clear the construction of a plug designed with the view of having the surging fuel gases clean the sparking points. The device is known as the B-G spark plug.

A cavity may be noted near the bottom, extending up into the steel thimble to a point near the center, where the space is filled by the mica insulation. Into this cavity four gas inlets extend, in addition to the gap around the sparking point. During the compression stroke, fuel gas is forced through all of the entrances into the cavity, and with sufficient speed through the spark gap to clean it thoroughly just prior to ignition, it is claimed. When the spark jumps, the gas within the plug explodes, along with the charge in the cylinder, and during the power and scavenging strokes the confined and expanding gases rush out of the plug cavity and blow out any carbon or oil that may have accumulated.

Cooling is provided for, as shown in the figure, by means of air vents to the chamber surrounding the steel thimble. As the exploding gases are in contact with this thimble, the internal heat is conducted to the outside and dissipated.

It is understood that Major Schroeder, in his recent altitude flight, used the B-G type of spark plug, which on account of its cooling facilities is especially adapted to aircraft work. It is intended, however, to manufacture this type of plug also for automobile use and to extend the application as far as possible into the general automotive trades.



B-G spark plug

Power Farming in England

THE need of educating British farmers to appreciate power farming implements has been emphasized by the tractor industry in England and, in this connection, the Departmental Committee on Agricultural Machinery has issued a report that makes some far-reaching recommendations. First, it points out that rule-of-thumb methods have prevailed too long in British farming and that there is a woeful lack of science about this farming. Next, it counsels research work on a most complete scale, embracing the soil and its treatment for various crops and local conditions.

It recommends the adequate testing of farm machinery and the circulation of reports on the ordinary working results of such machinery and implements, this service to be in the hands of a permanent body. It is also recommended that farmers, as well as manufacturers of the machines concerned, should conduct the tests and have a share in the arrangements of them. Educational courses in farming mechanics are suggested for youths to attend in their continuation school hours—under the new British Primary Education Act, boys are obliged to attend post-school classes to the age of 18 years and the school leaving age is raised to 14 years—and, lastly, it is recommended to equip agricultural colleges with modern farming machinery for demonstration and testing. The prime need is to get farmers interested on their own account and independently. At trials and demonstrations, one hears too frequently such criticisms as, "It is very well for that tractor in the hands of an expert; it wouldn't last a week in my man's hands," or, "What is the use of a stunt like that on single-horse land such as this?"

Let farmers be encouraged to organize the trials on their own account, locally, and let them be judges of conditions and results, always safeguarding the maker's interests by representation on committees of organization and conduct of the tests.

Backlash in Gearing and Methods of Its Measurement

This article shows that more or less backlash is necessary to provide free action between the teeth. The article also discusses the theoretically ideal gear, and how it may be made of practical worth.

THEORETICALLY speaking, gear teeth should run together perfectly without any backlash, but from a practical standpoint, owing to slight unavoidable inaccuracies in cutting and mounting, a certain amount of freedom must be allowed between the involute faces of the teeth, so that the teeth will not bind.

The term "backlash" is not generally well understood. Some refer to it in relation to center distance and others to reduction in tooth thickness, the latter being incorrectly stated as reduction in pitch diameter.

We can illustrate this point very clearly by a diagram. At A in Fig. 1 are two theoretically correct gears. They are correct for tooth thickness, pitch diameter, center distance, etc. This illustrates the ideal condition, which in practice is impossible to obtain. At B in Fig. 1 are shown two gears of the same tooth ratio, pitch diameter, etc., as those at A. In this particular case, however, it will be noticed that a feeler is inserted between the teeth when the gears are located at their correct center distance.

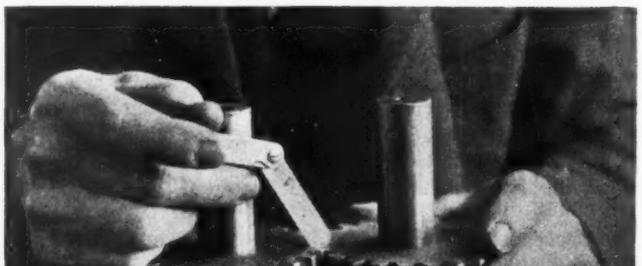


Fig. 2—Measuring backlash between gear teeth by means of thickness feeler

It should be noticed that the pitch diameter of the gears at B is identical with the pitch diameter of the gears at A, because the center distance has not been changed, nor has the tooth ratio. Therefore, backlash can only mean one thing—clearance between the teeth—which is satisfactorily measured by means of a feeler.

At this point it might be well to explain some of the misconceptions regarding the use of the term "pitch diameter." Frequently drawings are received on which the pitch diameter is given as a certain number of thousandths of an inch less than the calculated pitch diameter, which is found by dividing the number of teeth by the diametral pitch. It should be understood that as long as the center distance and tooth ratio remain the same, the pitch diameter is unchanged. When the center distance is given with a tolerance, then the pitch diameter would necessarily have the same tolerance, but backlash between gears is not obtained by reducing the pitch diameter.

With the generating type of cutter, backlash can be secured in one of two ways. One is by using a cutter which has teeth of a greater thickness than the standard tooth dimension on the pitch circle; the other is by feeding the cutter in deeper than standard depth.

When a large number of gears of a certain pitch are to be cut, and especially when the gears have a small number of teeth, it is advisable to use a special cutter having a tooth thickness greater than standard. This is done to

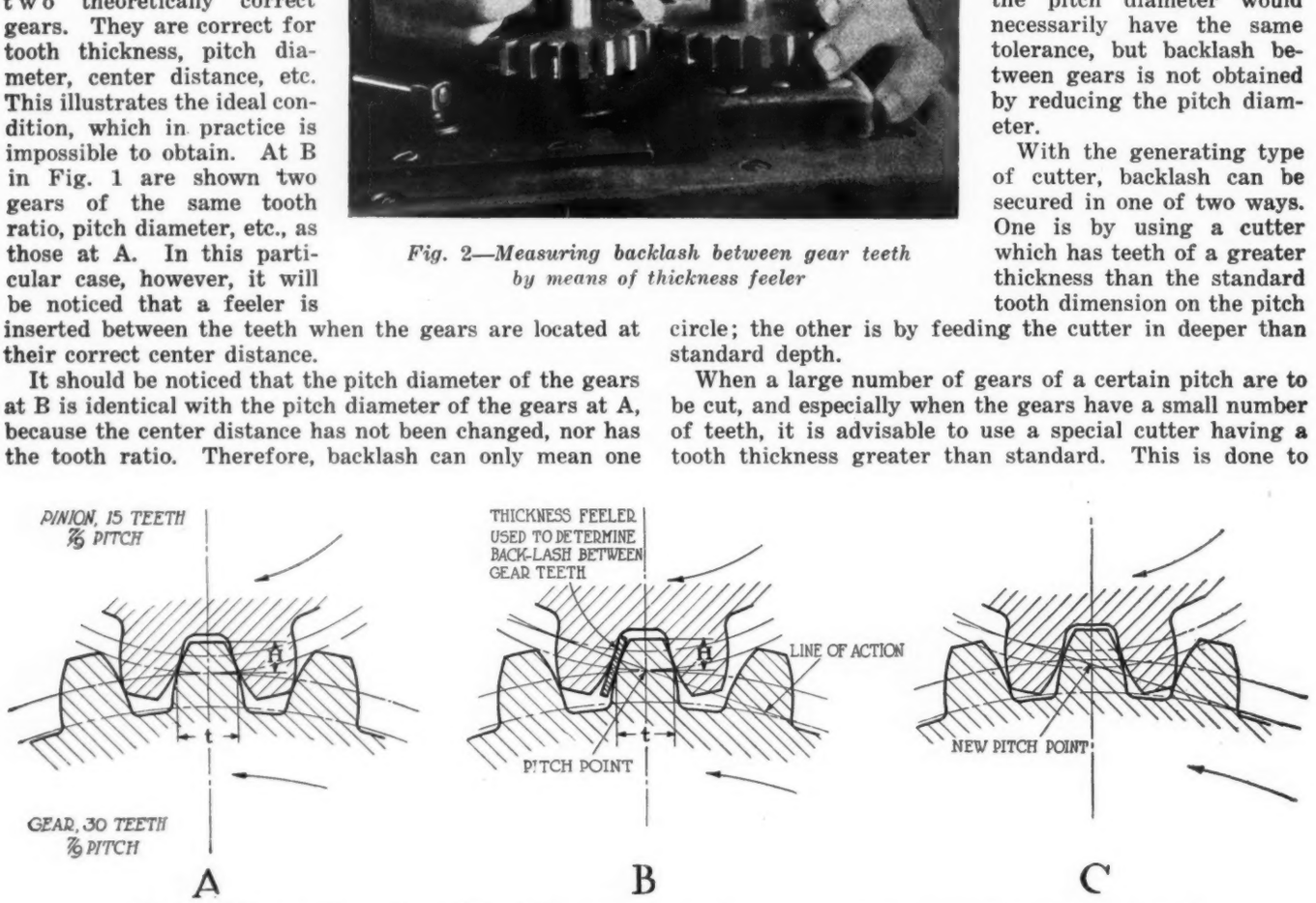


Fig. 1—Diagram illustrating theoretically correctly cut gears—means of measuring backlash by the thickness feeler; also by variation in center distance

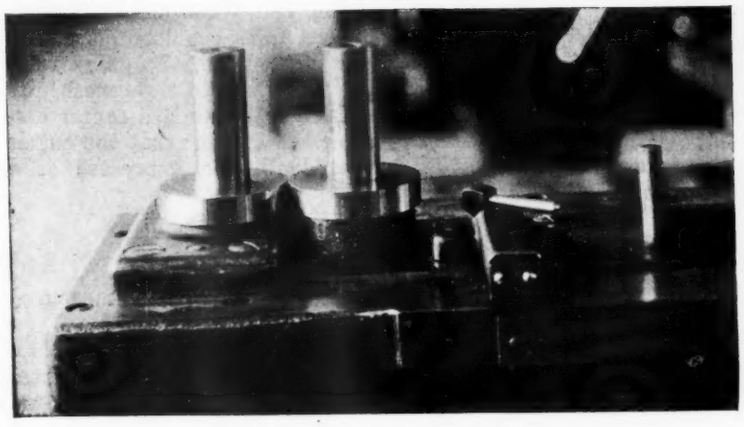


Fig. 3—Setting gear holding pins on a gear testing fixture by means of accurately ground disks equal in diameter to the pitch diameter of the gears being measured

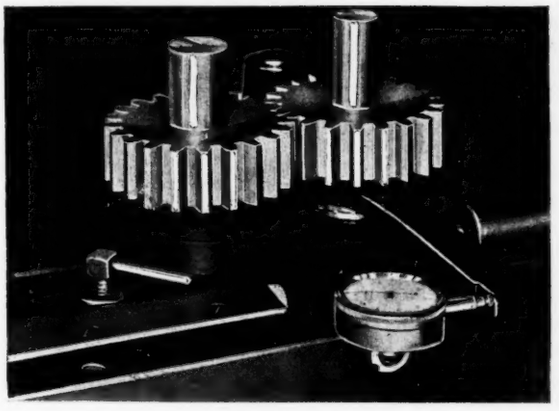


Fig. 4—Determining amount of backlash on a testing fixture by means of a dial indicator

reduce the undercutting on the tooth to the lowest possible amount.

We have previously stated that backlash is necessary to provide free action between the teeth, but this can be carried to the extreme. The backlash should be just sufficient to permit free action of the teeth. Any more than this not only weakens the tooth by reducing its thickness but also results in some cases in noisy gearing. When the drive is not constant and the backlash is excessive, the teeth will operate with a "chattering" effect which not only greatly increases the noise but also has a tendency to impart excessive momentary loads on the teeth. This condition is much more serious with the 14½ deg. involute than with the 20 deg. stub teeth.

The amount of backlash to provide is largely governed by the pitch of the gears, speed at which they are to operate, accuracy of tooth shape and spacing. Inaccurately cut gear teeth must be made with considerably more backlash to operate freely than those which are accurately cut. Gears to operate at high speeds should be accurately cut and should be provided with little backlash. This is especially true if the noise is to be reduced to the lowest possible amount. Table I gives the amount of backlash generally recommended for gears working under ordinary conditions and gears operating at high speeds.

There are two common methods of measuring backlash. One method, illustrated at B in Fig. 1, and in Fig. 2, consists in placing the gears on close-fitting studs, which are located at the correct center distance, and by inserting a feeler between the teeth, as illustrated.

The question of setting the pins on a gear measuring fixture is one that does not receive the attention it always deserves. When a large number of gears are to be measured, it is best to make two ground disks having diameters equal to the pitch diameters of the gears to be measured. These two disks, as shown in Fig. 3, are used to set the pins in their proper position for center distance. Once the pins are accurately set by means of these disks, the gears can be placed on the pins and the backlash can be measured by inserting a feeler between the teeth. The running qualities and eccentricity of the gears can also be determined at the same setting.

The second method is shown in Fig. 4 where use is made of a regular gear testing fixture on which the gears are located on studs with the teeth in close mesh with each other. The dial indicator is first set at zero by disks, as shown in Fig. 3. The gears are kept in close contact by means of a spring operating the arm carrying one of the pins. The backlash can then be measured by reading off the indicator in terms of variation in center distance, Table II being used in this connection.

Another method sometimes followed uses the gear-tooth caliper; this method is not to be recommended. It is not so easily applied as the two methods previously described and, furthermore, it is not so accurate.

In the methods shown at B in Fig. 1 and in Fig. 2, the backlash provided is indicated by the thickness of the feeler that can be placed between the teeth when the gears are

TABLE I

BACKLASH FOR SPUR GEARING

Ordinary Conditions		High-Speed Gearing
Pitch	Backlash, Maximum in Inches	Backlash, Maximum in Inches
2	0.020	0.0120
3	0.016	0.0100
4	0.014	0.0080
5	0.012	0.0070
6	0.010	0.0060
7	0.009	0.0050
8	0.008	0.0045
9	0.007	0.0040
10	0.006	0.0035
12–14	0.005	0.0030
14–18	0.004	0.0020
20–30	0.003	0.0020

TABLE II

BACKLASH, TOGETHER WITH AMOUNT THAT CUTTER SHOULD BE FED IN, AND DIFFERENT CENTER DISTANCES OBTAINED

	14½ Deg. Full-Length Tooth		20 Deg. Stub-Tooth	
Backlash in Inch	Amount to Feed Cutter in Beyond Standard Depth	Difference Between Measured and Standard Center Distances	Amount to Feed Cutter in Beyond Standard Depth	Difference Between Measured and Standard Center Distances
0.0010	0.0009	0.0018	0.0008	0.0017
0.0015	0.0014	0.0028	0.0010	0.0020
0.0020	0.0019	0.0038	0.0014	0.0028
0.0025	0.0024	0.0048	0.0017	0.0034
0.0030	0.0029	0.0058	0.0020	0.0040
0.0035	0.0034	0.0068	0.0024	0.0048
0.0040	0.0038	0.0076	0.0027	0.0054
0.0045	0.0043	0.0086	0.0030	0.0060
0.0050	0.0048	0.0096	0.0034	0.0068
0.0060	0.0058	0.0116	0.0041	0.0082
0.0070	0.0067	0.0134	0.0048	0.0096
0.0080	0.0077	0.0154	0.0055	0.0110
0.0090	0.0087	0.0174	0.0062	0.0124
0.0100	0.0096	0.0192	0.0068	0.0136
0.0110	0.0106	0.0212	0.0075	0.0150
0.0120	0.0116	0.0232	0.0082	0.0164
0.0130	0.0125	0.0250	0.0089	0.0178
0.0140	0.0135	0.0270	0.0096	0.0192
0.0150	0.0145	0.0290	0.0100	0.0200
0.0160	0.0154	0.0308	0.0110	0.0220

located at the standard center distance. The amount of metal removed from the sides of one gear tooth, as measured in a plane at right angles to the line of action, is equal to one-half the thickness of the feeler.

Now to determine the amount that the cutter should be fed in beyond standard depth the following formula is used:

$$d = \frac{b}{4} \times \cot. \alpha$$

In which:

d = depth to which cutter is fed in beyond standard.
b = backlash in inches.
α = pressure angle.

For example, assume that it is necessary to provide for 0.008 in. backlash between the gears illustrated in Fig. 1, which are of 7/9 pitch. Then:

$$d = \frac{b}{4} \times \cot. 20 \text{ deg.} = 0.002 \times 2.7475 = 0.0055 \text{ in.}$$

The cutter should be fed in 0.0055 in. beyond standard depth for both gear and pinion, and, when placed in position B, Fig. 1, a feeler 0.008 in. thick could be placed between the teeth. If, on the other hand, the gears were placed on pins and the teeth brought into close mesh, the difference between the measured and standard center distances would be equal to twice the amount that the cutter was fed in beyond standard depth; or, expressed as a formula,

$$d_1 = \frac{b}{2} \times \cot. \alpha$$

In which d_1 = difference between standard and measured center distances.

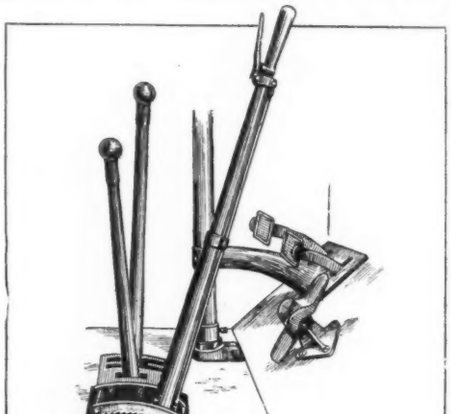
Therefore, in this particular case $d_1 = 0.0110$ in. approximately. Table II gives the amounts that standard cutters should be fed in to obtain various amounts of backlash, and also includes the difference between the measured and standard center distances, indicating the amount of backlash between the teeth. This table applies both to 14½ deg. involute and 20 deg. stub teeth.

Compound Transmission Designed for Motor Trucks

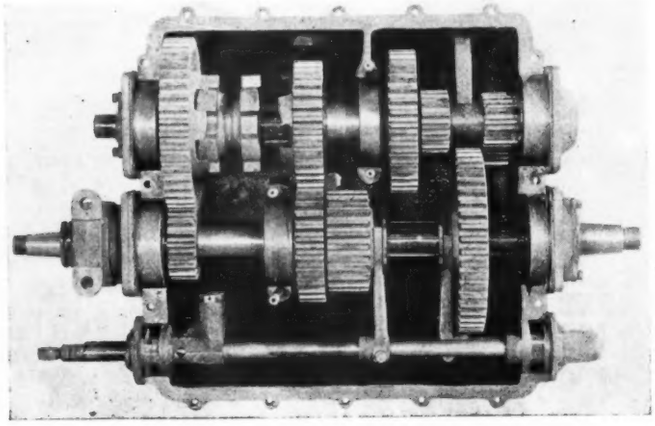
OWING to the great difference in the weight of a truck when loaded and empty, there is need for a greater number of gear changes than with a passenger car, the weight of which is not materially different when carrying only the driver and when carrying a full complement of passengers. The need for an increased number of gear changes is particularly great now that pneumatic tires are being fitted to trucks and permit of maximum speeds up to 25 m.p.h. In a 3½-ton truck, for instance, the load exceeds the weight of the truck itself, this making the loaded truck more than 100 per cent heavier than the empty machine.

To meet the situation thus outlined, the Fageol Motors Co. has developed a special truck transmission which, with a number of gears equal to that employed in the ordinary four speed and reverse transmission, permits of obtaining 5 speeds forward and 2 reverse. This result is obtained by a variable speed countershaft, the gears on which are controlled by a separate lever.

The transmission is of the geared-up type, that is to say, with the gears set for the highest speed the tailshaft turns faster than the clutch shaft. The transmission differs from the ordinary design in that there are two sets of constant mesh gears, one or the other of which can be put into action by a double jaw clutch on the secondary shafts. To keep down the distance between bearing supports and prevent noisy operation, intermediate bearings are placed on both the primary and secondary shafts. The low gear forward gives a reduction of 7.65 to 1; the second gear a reduction of 3.13 to 1; the third 1.725 to 1; the fourth is a direct drive, while the fifth speed is a geared-up drive, increasing the speed by 36 per cent over that of the clutch end. Consequently, the extreme gear ratios bear to each other a relation of approximately 10 to 1, instead of a little over 4 to 1 in the ordinary four speed transmission.



This sketch of the Fageol control shows the two ball-handled gear levers



Fageol seven speed gearset

An advantage is claimed for the extremely low first gear in that the slow application of power to the rear wheels in starting heavy loads reduces shaft breakage as well as the strains on the springs and radius rods. Once the load is started, there are four other gear ratios to meet varying road conditions. On a fairly level road the power required to keep even a full load in motion is relatively small and with the overgear high speeds are possible without racing the engine.

The driven gears of the two constant mesh sets are mounted free upon the countershaft, on roller bearings, and when not locked to the shaft by means of the jaw clutch, rotate freely upon it.

This transmission has been in use on some 300 motor trucks on the Pacific Coast during the past two years.

Organization and Method in the Testing Laboratory

The elimination of haphazard running of tests, with the keeping of complete and adequate records, is aimed at in the system described here by Mr. Tice. This article is supplemental to one recently published setting forth the equipment necessary for such a laboratory.

By P. S. Tice*

NO doubt some thought is given in most laboratories to method in conducting tests. Equally, there is no doubt but that much haphazard running is done, with no adequate records made and no very definite end in view in many otherwise well equipped laboratories. It seems that it would be greatly to the advantage of those directly concerned, and of the automotive industry in general, if all this could be changed, at least to the extent of making provisions in the apparatus for reasonably complete and accurate observations, and arranging observation sheets for recording the pertinent data.

Having made this introductory plea, it is purposed to describe the method employed in the dynamometer laboratory of the carbureter division of the Stewart-Warner Speedometer Corp. It is not intended to hold up this plan of operation as a shining example. But, it is the fact that it has proven to be adequate, in that it facilitates the acquisition of the specific information sought, and almost automatically provides a full record of the pertinent conditions and controlling factors. These virtues result, wholly and solely, from the fact that no work is undertaken before a reasonably complete plan of action is laid down. Starting from this point, there is a group of accessories to the main idea, each item of which contributes an essential part to the whole.

Apparatus and Equipment.—The purpose of the laboratory was considered first in designing and installing apparatus and equipment. Thus, needless expense was avoided, and, at the same time, it was assured that all the essentials would be present. The underlying idea in equipping and arranging the laboratory here used as a specific example, was the investigation of carburetion in its relationship to engine performance. From this point, the several items of equipment were defined by merely listing the observations that it would be necessary to make in the conduct of a complete investigation of this nature. And working from this list as a basis, apparatus and equipment were selected with which these observations could be made with accuracy and convenience to the observer. The apparatus selected for making these observations was described in a recent issue of AUTOMOTIVE INDUSTRIES. The full list of observations permanently provided for in the present case follows:

Quantities Observed and Computed

A—Air weight in lb./sec.
a—Area in sq. in.
C—A coefficient.
c—A constant.
D—Density of air in lb./cu. ft.
E—Efficiency.
F—Fuel consumption in lb./sec.
f—Fuel consumption in lb./HP/hr.
H—Pressure, absolute, in mm. Hg.
h—Pressure drop in mm. (Hg or H_2O).
HP—Horsepower, with prefixes B. F and I.
K—A coefficient.
L—Piston stroke in inches.
M—Pressure absolute in millibars.
m—Time in minutes.
N—Revolutions/min.
n—Number of working strokes/min.
P—Mean effective pressure in lb./sq. in. gage
p—Pressure drop in inches (Hg or H_2O).
Q—Torque in lb. at 63 in. radius.
R—Ratio by weight of air to fuel in mixture.
s—Time in seconds.
T—Temperature absolute, deg. F.
t—Temperature observed, deg. F.
V—Velocity in ft./sec.
v—Volume in cu. in.
W—Weight of fuel used in run, in lb.
X—Angular advance of spark, refers to crank.
Prime (′)—Refers to standard pressure and temperature (760 mm. and 520 deg. F. absolute).
Sub. 1—Refers to carbureter throat entrance.
2—Refers to carbureter throat.
3—Refers to mixture.
4—Refers to exhaust.
b—Refers to brake output.
i—Refers to indicated output.
j—Refers to air jet entrance.
m—Refers to mechanical.
t—Refers to thermal.
v—Refers to volumetric.
x—Refers to jacket intake.
y—Refers to jacket outlet.
Prefix *a*—Read: Air.
B—Read: Brake.
△—Read: Difference; specifically applied to carbureter metering head.
F—Read: Friction.
I—Read: Indicated.
v—Read: Vapor.

In addition to the above, there are some few items of a special nature, requiring special equipment as, for instance, the stroboscope and its phase changing drive used for observation of the charge in the intake manifolding, and the polar indicator for observing and recording the pressure cycle of the engine. Equipment of the nature of the last named items does not contribute directly to the record of quantities and conditions observed in the conduct of an investigation, however important it may be in guiding the work and assisting in the formulation of future work.

Observation Form Sheets.—The forms used are three in number and all three are used in each investigation. Each form bears twenty horizontal columns, numbered 1 to 20 and each bears an identical main heading, with the

*Director of the Carbureter Division, Stewart-Warner Speedometer Corp.

particular exception that they are lettered, A, B, and C respectively. In the heading a space is provided for a summary of the specifications of the investigation, for the date of the runs, for the name of the observer, for the number of the test and for the number of that particular sheet in the group constituting the complete record of observations in the test.

Sheet No. A, is filled in by the observer manipulating the controls and includes all of the observations of direct engine performance, of the quantities to which the setting of conditions is made, of the fuel consumption and of the pressures. Only those quantities, observations of which are always or almost always made, have definite vertical columns assigned to them. This leaves the sheet quite flexible with respect to the nature of the work in hand, since the desired headings can be filled in at the tops of the columns bearing no permanent headings.

Sheet No. B corresponds in every particular with the A sheet, except that its definitely assigned headings cover the air meter observations and those of the temperatures taken as a matter of routine.

The whole group of observations in a set of runs is thus made on sheets A and B. Sheet C is similar to the foregoing, but is used only for tabulation of the quantities computed from the observations, and for those direct observations that are included in the plottings. The aim is to make the C sheet present the whole of the results of the work. It becomes a summary of the significant data and is always a clean sheet. As a final word on the observation forms, it may be stated that the C sheets are filed with the original curves, in folders bearing the test number, and the A and B sheets are filed together in a large loose leaf binder, in numerical order, both with respect to test number and to their order in the test.

The Program of Tests.—We now come to what is undoubtedly the most important single item of what we have been pleased to call a "Method." Each test, examination or investigation, must have a definite aim if it is to mean anything in the picture.

Without stretching the parallel too far, one may liken the result desired in any specific investigation to a significant part of a perfectly balanced composition. One must not be left in doubt as to where thus and so properly belongs in the general scheme, which always exceeds the scope of the work in any one laboratory. And, in any one laboratory, each bit of work must have its place and bearing with respect to each other bit of work.

It is obvious that if this sort of result is to be accomplished, the work must be carefully laid out. Its director must do so for his own guidance, even in the case where he carries the investigation forward in person. And, granting the truth of this last statement, a detailed program is seen to be the *sine qua non*, where the actual work must be delegated to others. Such a program can be made complete to the last detail in pure research. In the case where research is carried on for the purpose of bringing about coincident development in device or design, completeness of program is apt to be impossible at the start of the work, since the program itself must be developed in the light of information uncovered as the work proceeds. But each piece of work, or group of runs in such a case, can be and should be completely laid down before it is undertaken in the laboratory.

Research Program.—Following is an example of what is meant, quoted from the records of the Stewart-Warner Carbureter Division:

Test 9—Examination of volumetric efficiency (E_v), with SHFS manifolds and no carbureter.
Observations: A, N, H, H_3, t, t_2, t_y.
Data: At each 100 N, 300 to 1400 inclusive; $t_y = 100$.
Plottings: E_v, h_3, t_2 and t_y vs N (1 sheet).

Test 10—Examination of volumetric efficiency (E_v), with complete SHFS (1¼ x 1); no fuel.
Observations: A, N, H, H_3, t, t_2, t_y.
Data: At each 100 N, 300 to 1400 inclusive, $t_y = 100$, open throttle.
Plottings: E_v, h_3, t_2 and t_y vs N (1 sheet).

Test 11—Determination of mixture ratios (R) for maximum brake mean effective pressure (max. P_b) and for minimum fuel consumption (min. f_b); with complete SHFS (1¼ x 1); gasoline fuel.
Observations: A, N, Q, F, H, H_3, $\triangle h$, t, t_3, t_y, X.
Data: At each 200 N, 400 to 1400 inclusive, and at H_3 = min., 300, 350, 400, 450, 500, 550, 600, 650, 700 and max.; adjust F to include range between min. f and max. Q; $t_y = 170$.
Procedure: Initially release engine from load and adjust F and X, at set N, until H_3 has min. possible value. At other H_3 values adjust F and X, at set N and H_3, to min. F with which engine will fire steadily; then adjust to successively richer mixtures, between runs, until Q = 0.9 max. Q, always adjusting X to secure the then greatest possible Q.

Plottings: P_b vs R, refers to H_3 and N (6 sheets).
f vs R, refers to H_3 and N (6 sheets).
(vH_3) vs R, refers to H_3 and N (6 sheets).
$t_3 - t$ vs R, refers to H_3 and N (6 sheets).
X vs R, refers to H_3 and N (6 sheets).
f_b vs P_b, refers to H_3 and N (6 sheets).
min. f_b vs P_b, refers to all H_3 and all N (1 sheet).
R vs M_n, refers to max. P_b and min. f_b, all N (1 sheet.
$t_3 - t$ vs M_n, refers to max. P_b and min. f_b, all N (1 sheet.
X vs M_n, refers to max. P_b and min. f_b, all N; with auxiliary scales of compression pressures and temperatures (1 sheet).
P_b vs D_n, refers to max. P_b and min. f_b, all N (1 sheet).
f_b vs D_n, refers to max. P_b and min. f_b, all N (1 sheet).
F vs A, refers to max. P_b and min. f_b, all N (1 sheet).
(vH_3) vs (aH_3), refers to N (1 sheet).
$\frac{A}{\sqrt{\triangle h}}$ vs M_n, refers to N (1 sheet).
$\sqrt{\triangle h}$ vs A, refers to N (1 sheet).

The work listed in the above partial program may be classed as pure research, since attention was concentrated on the results for their own sake, with no immediate intent of future modification through development changes in the material subjected to test. Attention is directed to the simplicity of this program, which at the same time includes all the essentials to the plotting of a complete graphic record of the engine's performance, under the conditions imposed by its carburetting system. Not only are its possibilities laid bare but also its requirements for the accomplishment in service of specific results.

To further facilitate the work, a sheet on which are listed the observed and computed quantities and their symbols, is attached to the program, together with a second sheet giving the relationships of the quantities represented by the symbols. These relationships are expressed in the form of equations, reduced to their lowest general terms. To simplify computation, a third sheet is attached, bearing only those equations which can be further simplified by inclusion of the specific engine dimensions in the numerical constants. This last sheet, of course, applies only to an engine having the dimensions of the one under test, while the before-mentioned relationship sheet is of general applicability.

The net result of including these sheets in the group issued to the laboratory crew, is that any one of them can compute the results of a test, whether or not he is capable of evolving the relationships for himself or knows what the test is all about.

Plotting the Results.—As a general thing the results of a test are of little use before they have been plotted; and upon the manner of their plotting largely depends their usefulness. Judging from the curve sheets one sees, there is much difference of opinion as to what constitutes

an adequate plotting of test results. It seems that best general practice may be summed up about as follows: (*a*) extension of all co-ordinate scales to zero; (*b*) location of zero intersection of axes at lower left corner of the sheet; (*c*) selection of scales of co-ordinates which neither mask nor exaggerate the importance of the quantities plotted; (*d*) selection of co-ordinates which express the results in the most useful and intelligible terms; (*e*) inclusion of *all* points found or reduced; (*f*) exercise of great care in the running of curves through such points; (*g*) inclusion of an adequate title or descriptive specification on each sheet.

Of course, there are exceptions to some of the above. In many plottings, nothing is added to their value through rigid observance of item (a) and something may be lost thereby if the plotting is made on a sheet of limited dimensions. But it may be taken that, in any case, the more significant quantity plotted should have a scale including the zero. Item (b) is listed above because it is the usual method and because it almost always serves as well as any other arrangement. Selection of scales for plottings, item (c), is a matter of considerable importance, but is a matter that each investigator must decide for himself, having due regard for the nature of the data plotted. In this connection, it is obviously folly to plot two sets of points having a variation of the order of two or three per cent and make that difference look like a million dollars on the curve sheet. It may be argued that unless the plottings are strictly for home consumption, or unless generally used, quantities will not express the relationship it is desired to portray, it is best to express results in terms that are in general use. At the same time, no opportunity must be neglected to bring about a more general use of plottings of the really fundamental relationships. Unfortunately, no particular attention has been paid to this latter point in the majority of cases, in the past. In obvious illustration of this point may be cited the practice of producing brake horsepower plottings from engine tests and wholly neglecting to present the really fundamental graph of brake mean effective pressure.

Standardization of curve sheets is an essential, at least to the extent of always making like plottings to the same scales of ordinates. Complete standardization is a thing that cannot be brought about, except within a given research organization. And, in each case, it should be carried only to that point at which it just falls short of limiting the graphic qualities of the plottings.

Progress Records.—Parallel with the conduct of work, complete logs or daily records should be kept. This applies both to the operation of the laboratory equipment and to the results obtained in execution of a research program. In the case of the Stewart-Warner dynamometer laboratory, two logs are kept. One member of the laboratory crew is charged with the making of a complete record in the "Laboratory Log," of everything done, and everything that happens with respect to the apparatus, as well as with posting from day to day the number of the test then in progress.

The second record is known as the "Research Log" and presents in narrative form, with suitable headings, datings, classifications and sketches, progress made, and the whys and wherefores of all development modifications that result from the work.

Reports.—Two methods of reporting results are employed. The curve sheets from each group of tests involving the same equipment are gathered and bound into folders, together with a copy of the program from which they resulted. Each of these is known as a "Summary," is numbered in the order of its completion and is unaccompanied by text matter.

Reports proper are all that the name implies. They include a complete statement of purpose and program, as well as a discussion of the results and the conclusions drawn from them. Since all completed work is initially developed into a summary, the reports in all cases are elaborations of a summary or group of summaries.

It is the practice of the carbureter division to prepare a sufficient number of copies, both of the summaries and reports, for distribution to its own general file, the laboratory record file, that of the general engineering department and to those whose engines or other apparatus had a part in the investigation.

Heating Rivets Electrically

THE illustration shows an electric heater of simple design, designed for the use of alternating current, the consumption being 14 to 20 kw.h. per 100 lb. of rivets. A single rivet can be heated at a time, or from two to five, the machine being made in different capacities. Operation can be discontinued instantly and current saved. The American Car Foundry Co. are the manufacturers of the machine known as the Berwick electric heater.

The electric equipment consists of a step-down transformer. The secondary coil is of one turn and has a movable jaw in which to insert the rivets for heating, as indicated in the figure. An induced current of from 10,000 to 20,000 amp. is used for the heating at voltage of 2.2, in connection with a primary coil on a 220 volt circuit. A voltage of 440 can be used.

Among the advantages claimed for electric heaters of this type are that a minimum number of rivets are spoiled through overheating; low operating cost; freedom from dirt, gas and excessive heat; reduced fire risks; speed in heating, a half minute being sufficient to attain the proper temperature; and an even distribution of temperature. Whenever the work in hand is interrupted a switch is opened and the rivets cool off gradually. Upon resumption of work, the switch is closed again, whereupon the rivets are again heated without being damaged.

Rivet heating in the Berwick electric furnace

An Industrial Housing Development for Present and Future Requirements

Such developments are frequently neglected until the demand has outstripped the supply so far that equalization is nearly impossible. A number of interesting features both of policy and construction are presented in the development described here. These make for contented workers.

By Norman G. Shidle

"WHERE can I get a house to live in?" This is perhaps the question most frequently asked of an employment manager by married men about to be employed in a plant. And the single men ask a similar question, "Where can I get a room?" The shortage of houses for industrial workers is almost a nation-wide condition; certainly it is universal in the automotive industry.

The employment manager in a large concern at Bristol, Conn., said recently: "The housing shortage is by far the largest factor in our labor turnover. If there were room enough to house all the men and their families, we could cut out a very large percentage of our present turnover."

This statement was made in New England, but it might just as well have been made in New York, Detroit, Cleveland, Akron or any other part of the country where large industrial centers have been developed. Many firms have built houses for their employees, many others would like to do so but cannot for one reason or another. Most of those firms which have built, however, have been unable to come even within striking distance of meeting the entire demand even so far as their own plants are concerned.

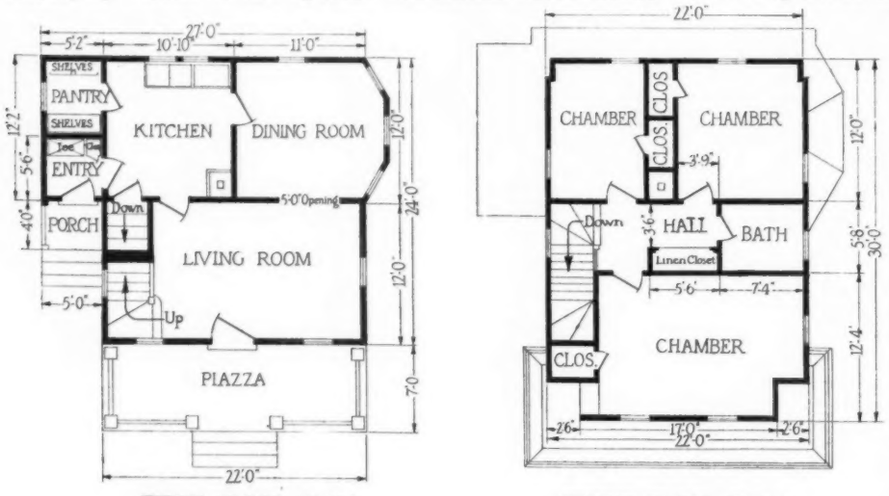
With such conditions prevalent, the new development of the Fellows Gear Shaper Co. is of especial interest. Although the plan is not of exceptional size, it comes closer, by virtue of the specific conditions surrounding it, to meeting the entire plant housing problem than the ordinary development of a similar nature.

The plant is located in a small New England town where it is possible to determine rather accurately just how many houses and rooming places there are for the workmen. More than 700 men are employed at the Gear Shaper plant. A previous housing plan, promoted by the firm in conjunction with the Jones & Lamson Machine Co., takes care of some families and the company has, by the financial assistance of one kind and another, helped forty-seven other men to obtain houses for themselves and their families.

The latest housing development, known as "Mountain View," consists of fifty houses. The development is within easy walking distance of the plant—as is every other section of the town—and will be completed about the first of July. The tract is well named, as the accompanying photograph proves. To the city resident, the beautiful view afforded from every window of these houses would be worth much money in itself. Even by the natives of the little town, the site of this development is considered the best in several miles.

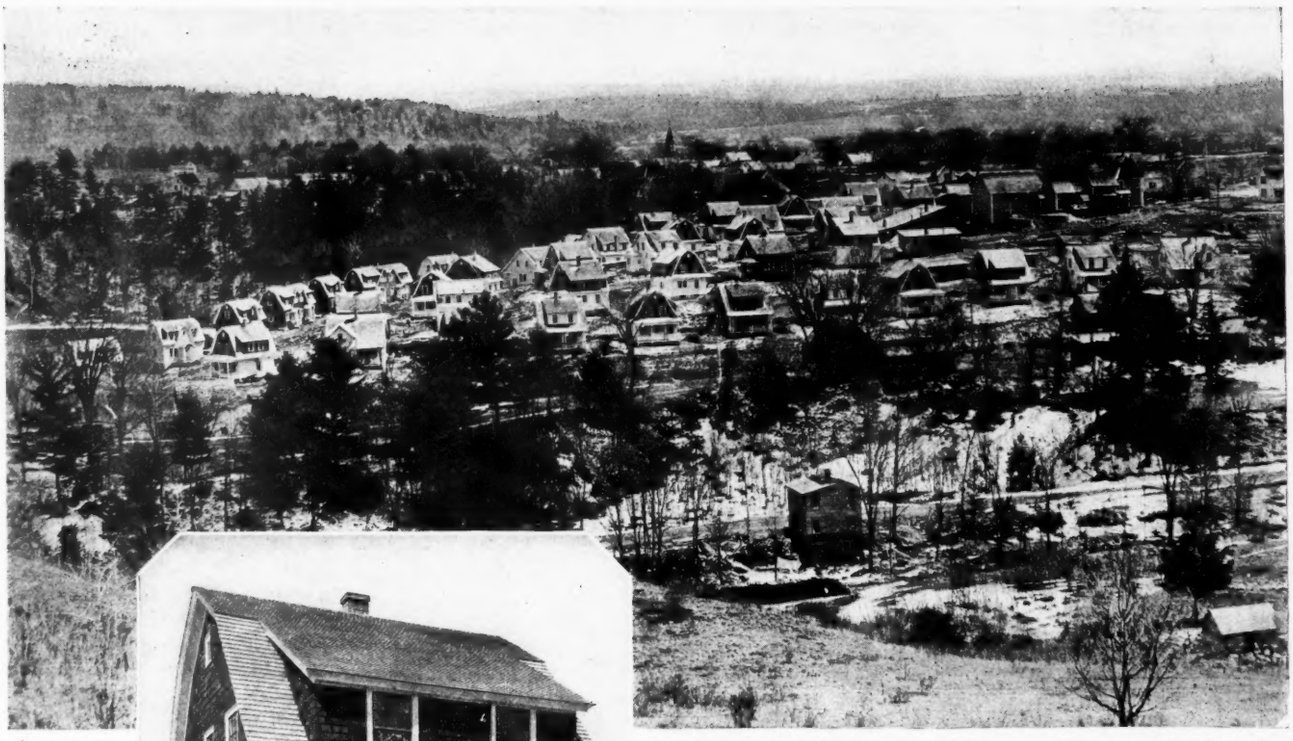
Of the 709 men employed in the plant, 300 are single and 369 are married. Nearly half of the latter group are natives of the town or vicinity, so that they already had homes or dwelling places when they came there to work. Eliminating approximately 170 in this class there were 200 married men in need of homes. Of this number forty-seven men have been aided by the company to purchase homes, while at least fifty more will be cared for by the new "Mountain View" development. These facts show that the firm has been able to care for a much larger percentage of their married men than the average. In fact, it is probably true to say that 50 per cent of the married men in this plant either own their own homes or are in the process of buying them. It is this record which makes the "Mountain View" development of special interest.

The development covers 11¼ acres, and will be equipped with garden plots, trees and well-graded streets when finally turned over to the men who are buying the houses. The homes are of three sizes—four, five and six rooms—while there are twelve different types of houses. This latter feature is in line



FIRST FLOOR PLAN SECOND FLOOR PLAN

First and second floor plan of one type of six-room house



(Above) Bird's-eye view of the partially completed housing development of the Fellows Gear Shaper Company

(Left) A "close-up" of one of the six-room houses. The streets will be graded, the lawns laid out and a small garden plot attached to each house

A section of the development, showing the different types of houses. In the background is the plot purchased by the Fellows company for future housing development. It is across a small river

with the best practice in industrial housing, since each man naturally desires to have his home somewhat different from the one next to him. Thus the company policy of developing rather than suppressing the individuality of its workers is evidenced in this.

The houses are modern in every respect, being equipped with electric light, furnace heat, gas, sewer connections, hardwood floors, and full-sized cellars. They are, in fact, attractive, comfortable structures which any man, office worker or manual laborer, would be glad to call "home." The architect's drawings of one of the six-room houses is shown in the accompanying figure. Each house is of the two-story type, the bathroom and sleeping rooms being located on the second floor. Particular attention has been given to pantry and laundry space, while every room is well lighted by several windows. The houses are sold to the workmen at cost to the company.

It is almost necessary for one to live a while in a small New York apartment house, where ample light is

Plans for an Attractive Housing Development

PLANTING LIST

		PLANTS
	VINES	
1	ACTINIDIA ARGUTA	15
2	CLEMATIS PANICULATA	25
3	CELASTRUS SCANDENS	20
4	AMPELOPSIS ENGELMANNI	10
5	ARISTOLOCHIA SIPHO	6
6	ROSA WICHURAIANA 7 PERKINS	50
7	ROSA HOWARTH 7 PERKINS	50
8	ROSA LADY GAY	25
9	AKEBIA QUINATA	20
	TREES	
10	ACER SACCHARUM	55
11	ACER PLATINOIDES	35
12	TILLIA AMERICANA	35
13	QUERCUS RUBRA	15
14	ULMUS AMERICANA	10
15	BETULA PAPYRIFERA	20
16	SALIX PENTANDRA	5
17	SALIX PENTANDRA	12
18	QUERCUS PALUSTRIS	25
19	SORBUS AUCUPARIA	18
A	ACER RUBRUM	15
	SHRUBS	75
20	ARALIA PENTAPHYLLA	600
21	BERBERIS THUNBERGII	40
22	CORNUS ALTERNIFOLIA	40
23	CORNUS SIBERICA	45
24	CORYLUS COLURNA	10
25	DEUTZIA LEMOINEII	35
26	DIERVILLA ROSEA	30
27	DIERVILLA CANDIDA	30
28	EUONYMUS ALATUS	20
29	FORSYTHIA FORTUNEII	40
30	FORSYTHIA VIRIDISSIMA	50
31	LIGUSTRUM IBOTA	25
32	LIGUSTRUM REGELIANUM	15
33	LONICERA MORROWII	15
34	LONICERA TARTARICA ROSEA	15
35	LONICERA RUPRECHTIANA	15
36	PHILADELPHUS CORONARIUS	30
37	RHODOTYPOS KERRIOIDES	70
38	RHUS TYPHINA	6
40	RHUS COTINUS	15
41	SPIREA VAN HOUTEII	60
42	SYRINGA VULGARIS	30
43	VIBURNUM DENTATUM	30
44	VIBURNUM FLICATUM	30
45	SYMPHORICARPOS RACEMOSUS	30
46	SYRINGA VULGARIS ALBA	20

INDICATES GARBAGE CAN.

INDICATES CLOTHES REEL.

TREE PITS TO BE 3' DIAMETER & 3' DEEP FILLED WITH GOOD TOPSOIL
PLANTING BEDS TO BE 1' DEEP FILLED WITH GOOD TOPSOIL.

Ground plans of the housing development under construction at Springfield, Vt.

scarcely available and ample heat only occasionally, to appreciate properly the real value of these houses, not only within the structures themselves, but in the surroundings and atmosphere as well.

Diagonally across the little river from the northeast end of the "Mountain View" development, the company has purchased another plot of ground to be used for future housing development. Although the present housing needs are not adequately filled, the ultimate housing program must, of course, take its place in the general production plan.

The chief points of interest in this particular development are:

1. **An attempt to meet the situation was made before the growth of the plant had become so great that there was almost no hope of solving the housing problem.**
2. **The dwellings erected were carefully planned to fit the needs of the particular situation.**
3. **The necessity for future housing development is already recognized and provided for.**

The effect of such plans and developments upon labor turnover are of necessity indirect. It is reasonable to suppose, however, that the large percentage of married men owning homes has a definite bearing on the low turnover of this plant.

Automotive Exports to Japan

AMERICAN makers seem to be going after the automotive markets of Japan in a vigorous manner, as many of the better known manufacturers have well established agencies there, principally in Tokio or Yokohama.

The sales of several cars, particularly, are being pushed with energy and success. Information to New York exporting houses evidences this fact, as it evidences also the preponderance of the American automobile in that country.

Abstracts of the Japanese customs house records at Yokohama and Kobe for the year 1919—as received in New York by Frazar & Co.—show that only twenty cars having an origin other than America were cleared through these ports during the year. Of the twenty, two were English, seventeen were Italian and one perhaps of American manufacture, had been re-exported from the Dutch East Indies. Thirty-eight were received in February from Canada but all of the other cars, totaling some 1742, were from the continental limits of the United States. In 1920, the records for January and February revealed two from England and one from Italy, against 215 from the United States.

Sales of cars to Japan are, of course, limited because of the road conditions. The motor truck so far has not made much headway; a few motorcycles have been sold, and the tractor, because of the small farms, has been taken up but little. A commercial estimate, made by one of the largest of the exporting houses, revealed that the cars in Japan totalled some 3000 in January, 1918, and it was believed that the present ownership would not be more than 2000 above that number. In fact, the number 5000 was given by the New York representatives of one of the largest Japanese firms—which maintains an automobile division—as a close approximation for the present time, the number of trucks being placed at 500.

Yokohama is the port of entry to which the largest number of American cars are sent, more than ninety per cent of the total going there, while the remainder are being forwarded to Kobe. As Tokio is, of course, the chief market, transportation from Yokohama consumes but a comparatively short time. Frequently, the cars are assembled after being unloaded and then are driven overland to the capital city. Some, however, are sent to Tokio in their original crates and are made ready for use at that point. It was said that there was no great shortage of mechanics for the work and that many of the assembly plants and garages were manned almost exclusively by Japanese. In this connection, one firm exporting to Japan now has an assembling plant at Yokohama and is constructing an additional one at Tokio.

Import duties into Japan on complete chassis are given by the Bureau of Foreign and Domestic Commerce at 35 per cent on the c.i.f.—cost, insurance, freight—value at the port of entry. Parts are dutiable at 25 per cent and it was suggested that car makers might save by shipping their chassis knock-down from this country, thus reducing the tariff by 10 per cent. The law was framed to encourage the industry in Japan. However, the common practice is to ship the chassis complete, including the engine, but completing the assembly by the addition of the body structure after arrival in that country. In shipping trucks, care should be taken that the driver's seat and cab parts are not included, as the rate is increased.

Until a short time ago, practically nothing other than chassis were shipped from this country. The last few months have witnessed a change in this, by one company at least, and recent shipments have been largely on the basis of half chassis and half completed cars. The change in shipment methods was ordered by the company's representatives in Japan and was not fully understood in this country. It possibly was caused by a shortage of materials there or by labor difficulties.

Japanese conditions were characterized by American companies as frequently demanding different bodies than was the custom of this country. Larger carrying capacity was said to be one prime necessity, especially for the native owner, whose family frequently was large. Less foot-room is required by the Japanese and this has given rise to the construction of different style bodies. These conditions, however, are taken care of largely by the body constructors within the country and need not particularly concern the manufacturer who ships only chassis. And, although the American chassis, as one exporter said, may assume a "fantastic and unusual" appearance before the native has put it in operation, the resident foreigner demands the same car he used at home.

Rumors were current among certain exporters several months ago that the Japanese were preparing to market an imitation of the Ford car under another name and otherwise changed. Investigation, however, seems to disprove the immediate possibility of such a move and a Japanese engineer in New York declared he did not believe such manufacture would be possible within at least five years. The parts manufacture, likewise, was said to be so nearly non-existent in Japan, excluding tires, as to require almost complete importation of such products.

Tires are being produced cheaply in Japan by two firms maintaining manufacturing branches there, one an American and the other English. The extent of this tire service was such that one firm shipping heavily into Japan took up the question of exporting its cars without tires. But this was not done, as manufacturers' discounts and other factors made it desirable to continue the old method of shipment. However, exports of tires from this country to Japan have increased from year to year.

The FORUM

Problems of Engine Design for Pneumatic Tired Trucks

Editor AUTOMOTIVE INDUSTRIES:

THE writer notes in the Forum in your March 11 issue, comments relative to the effect of the use of pneumatic truck tires on engine design. This is an interesting question and one, it seems, that will bring forth considerable comment pro and con.

It seems logical to suppose that if engines of standardized size and design, which have heretofore been used in vehicles using solid tire equipment and the usual gear ratios, are to be used in pneumatic tired trucks from which greater speeds are demanded than is possible where solid tires are used, then the speed of such engines must be increased to provide the additional power necessary. If former engineering practice of limiting (under the guarantee) engine speed not to exceed 1000 piston feet per minute is maintained, then engines of the old type of design, such as splash and so called pressure feed lubricating types, cannot with safety be used for the purpose, merely by increasing their piston speed to secure the additional power necessary. The increase required would be too great for the average engine to withstand the strain for any considerable time, not because of failure of material used in its construction so much as because of failure of lubricating the vital parts sufficiently under their abnormal load and speed conditions of service.

It would, therefore, be necessary to increase the size of the power plant, change gear ratios accordingly and absorb the cost of so doing by increasing the selling price.

As an illustration:—If an engine is operating at 1000 piston feet per minute and the truck speed (solid tire equipment) is 12 m. p. h., to secure 18 m. p. h. truck speed on pneumatics with the same gear ratio and tire diameter would require 1500 piston feet per minute engine speed. It is doubtful if any of the old line manufacturers of engines would guarantee their product for continuous service under such conditions. In fact, it would be dangerous to do so, unless a more perfected method of lubrication, including heat reduction in the shaft bearings by oil circulation through the shaft, was used to meet the new high speed and load conditions.

Another reason which seems to the writer to be a still greater handicap to increase engine speeds and loads is the method commonly used of setting up bearings so tight. This is responsible for a great part of the bearing temperatures set up in the main journals and connecting rod bearings, and the inability of iron wearings, sand, etc., which accumulate in the oil, to work out of the bearings without doing serious injury to them. The method of drilling crankshafts from the main journals to the crank pins, thus allowing, in fact forcing, all dirt that may be in the oil directly against or into the connecting rod bearings, is wrong. It does not allow the engine to provide the service to the customer it would be capable of performing if such causes of trouble were eliminated. Neither does the connecting rod design lend itself to excessive loads at high speeds without danger to the bearings.

It seems rather that the solution is either in the larger engine at reduced speed, but increased weight and cost, or in the design of the engine of regulation size, which will allow a guaranteed speed of 1500 piston feet per minute, with largely increased power output, but no increase in cost, with higher thermal and mechanical efficiency and lower fuel consumption as a necessary accompaniment. This is not only possible, but is already an accomplished fact. The principle involved in the making of such an engine is simple when once understood and might be summed up in the following few words: Lubrication by volume (not viscosity) under pressure and pressure as per load—not as per engine speed.

MIDWEST ENGINE COMPANY.
P. J. Dasey, Sales & Research Engineer,
Truck and Tractor Engine Division.
Indianapolis, Ind.

Materials Tests

Editor AUTOMOTIVE INDUSTRIES:

REFERRING to an article that appeared in the issue of Sept. 11 of AUTOMOTIVE INDUSTRIES, by Dr. Rosenhain of England, as well as comments in the Forum of your publication (issues of Oct. 2 and Oct. 16), I beg to advise that I have read the article and discussions in question carefully and with a view particularly of seeing in what way the American Society for Testing Materials might follow up some of the suggestions of Dr. Rosenhain. As Mr. Alden has stated in his letter, published in your Oct. 2 issue, Dr. Rosenhain has simply pointed out in a clear and forcible way the thoughts that have been in the minds of many engineers.

There is much in Dr. Rosenhain's article that will be of interest to our Committee on Methods of Testing, and I shall be pleased to bring the article to the attention of that committee. There is one aspect of this matter to which it might be well to call attention. The constant endeavor of all the committees of the society which, as you know, deal with a number of materials of engineering construction, has always been to devise as simple mechanical tests as possible, and, so far at least as steel is concerned —and tests of steel have been quite evidently uppermost in Dr. Rosenhain's mind—our committee has, I think, sought "to measure one physical property or constant at a time," quoting from the first conclusion at the close of Dr. Rosenhain's article. I do not know that I clearly understand whether Dr. Rosenhain would condemn on this score the drop test of rails, axles, car wheels, etc., or the so-called "proof tests" by which certain steel parts (for example, alloy steel axles for locomotives and cars as specified by the A. S. T. M.) are, piece by piece, subjected to an impact test designed to reveal any serious and presumably hidden defects before the piece goes into actual service.

We conceive it to be more or less outside of our field to enter into a discussion of the problem of the designer of a structure in selecting the proper material to be used in that structure. Dr. Rosenhain suggests the use of so-called "Figures of merit" obtained by giving due weight to, for example, the tensile strength and notched-bar impact resistance of the material. Other merit figures have been

proposed, such as the product of tensile strength and elongation or the product of elastic limit and elongation. Of course, in the preparation of our specifications, both the consumers and producers of the material are represented. The consumer has, or should have, a definite idea of the kind of material he desires for a specific purpose. The properties of that material are considered and tests devised to determine those properties and to make sure that material ordered under specifications has the desired properties. While there is often much discussion in some of our committees as to relative importance of the various mechanical properties, it is, after all, the province finally of the designer to weigh one property against another and to select the type of material that he wishes to use for any given construction.

C. L. WARWICK,
Secretary-Treasurer,
The American Society for Testing Materials,
Philadelphia, Pa.

More Regarding Horsepower Formulæ

Editor AUTOMOTIVE INDUSTRIES:

I HAVE read the reply by Mr. Chesnutt in AUTOMOTIVE INDUSTRIES of March 18, 1920, to my letter in the issue of Dec. 4, 1919, suggesting the adoption of the formula H.P. = $B^2SN/12$ in place of the obsolete N. A. C. C. rating H.P. = $B^2N/2.5$.

In my last letter I compared the actual brake horsepower of a number of engines (selected by Mr. Chesnutt) with the calculated power by the $B^2SN/12$ rating and with the rating H.P. = 3.14 π $B^2SN/40$ suggested by Mr. Chesnutt in the Oct. 9 issue of AUTOMOTIVE INDUSTRIES. The average error (1.63 hp.) of the π $B^2SN/40$ rating was approximately twice the average error (0.87 hp.) of the $B^2SN/12$ rating. The maximum error of each rating bears about the same relation as the average error (2.8 hp. as against 1.5 hp.). There would seem to be no question, therefore, as to which rating is the more accurate.

Mr. Chesnutt's rating is equivalent to H.P. = $B^2SN/12.76+$. The decimals in the denominator are the cause of the inaccuracy of his rating. Could I not persuade him to discard them?

The object of such a rating as that of the N. A. C. C. seems to be much misunderstood. It is not to give a scientifically exact indication of the power produced by an engine. On account of the great effect of design on performance that can only be determined by a study of the power curve giving the horsepower at various speeds of the particular engine under discussion. The purpose of a horsepower rating is to give as quickly as possible a fairly close estimate of the power so that a number of engines can be readily compared. The closer that such a rating comes to the average of a large number of engines actually tested the greater the merit of the rating.

Mr. Chesnutt and I are in cordial agreement as to the utter worthlessness of the H.P. = $B^2SN/2.5$ rating. For eleven years I have been pointing out in the technical press the shortcomings of this rating which is based on the fallacy that the number of revolutions per minute of an engine varies inversely as the length of the stroke, and which arbitrarily limits the speed of the engine to 1000 piston feet per minute. My first communication on the subject appeared in *Motor Age* for April 1, 1909.

According to the N. A. C. C. rating any four-cylinder engine of 4 in. bore should develop 25.6 hp. regardless of the length of the stroke. The absurdity of this assumption can be made manifest by taking two engines tested by Mr. Chesnutt. The bore and stroke of engine A are 4 x 5 in. and of engine B 4 x 6 in.

Engine	B.H.P.	HP. = $\frac{B^2N}{2.5}$	Error	HP. = $\frac{\pi B^2SN}{40}$	Error	HP. = $\frac{B^2SN}{12}$	Error
A	27.0	25.6	—1.4	25.1	—1.9	26.6	—0.4
B	33.0	25.6	—7.4	30.2	—2.8	32.0	—1.0

From the above comparison it will be seen that it is impossible to compare intelligently by the N. A. C. C. rating two engines of the same bore and different strokes, a long-stroke engine being grossly underrated.

Mr. Chesnutt in his letter in AUTOMOTIVE INDUSTRIES of March 18 made the following statement:

"Although Mr. Ide did not mention the fact, the rating he submitted, namely H.P. = B^2SN, (sic) is precisely the Denby-Marshall (sic) formula, which I must say was unknown to me when I proposed the H.P. = $P.D./10$ rating.

I assume that the first error in the above sentence is a typographical one. The rating I submitted is H.P. = $B^2SN/12$. From the second error I suspect that Mr. Chesnutt read an unsigned letter in AUTOMOTIVE INDUSTRIES for Jan. 8 in which the name "Denby-Marshall" appeared. The name evidently intended is that of Mr. C. F. Dendy Marshall, the well-known British scientist. Now if Mr. Chesnutt will refer to the correspondence columns of *The Autocar* (London) for July 3, 1909, and the succeeding issues, he will learn that the rating H.P. = $B^2SN/12$ was devised by Mr. Dendy Marshall and myself independently in December, 1906.

Mr. Chesnutt erroneously assumes that the $B^2SN/12$ rating is necessarily based on 1000 r.p.m. This speed is taken merely for the sake of convenience, the formula in its full expression being H.P. = $B^2SNR/12000$. In any well designed engine the power curve over a fairly wide range of speeds closely approximates a straight line. In other words, the power increases, within certain limits, directly as the speed.

The 4 x 6 in. four-cylinder engine tested by Mr. Chesnutt would, according to the $B^2SNR/12000$ formula develop 32 hp. at 1000 r.p.m. and 48 hp. at 1500 r.p.m. Would Mr. Chesnutt let us know the actual power of this engine developed at 1500 r.p.m.? It was 33 hp. at 1000 r.p.m.

The formula is obviously not intended to be used for such extreme speeds as 3000 r.p.m. which comparatively few standard type engines can reach. Mr. Chesnutt's objection that the H.P. = $B^2SNR/12000$ formula would overrate the power of an average engine at this speed, therefore, has no weight.

Mr. Chesnutt maintains that the large majority of manufacturers state in their catalogs the piston displacements of the engines that they use. Granted that this is the case, why should one pore over the catalogs of the various cars, the engines of which he wishes to compare when there is available a rating that requires no research and that is considerably more accurate than the one suggested by Mr. Chesnutt?

As brought out in my previous letter, the simplicity of the rating H.P. = $B^2SN/12$ is really extraordinary, as it resolves itself into H.P. = $B^2S/3$ for four cylinders, H.P. = $B^2S/2$ for six cylinders, H.P. = $B^2S/1.5$ for eight cylinders and H.P. = B^2S for twelve cylinders.

JOHN JAY IDE,
Lieutenant U. S. N. R. F.

Correction

IN the April 8 edition of AUTOMOTIVE INDUSTRIES is described the manufacture of pistons in the Spencer-Smith plant at Howell, Mich. On page 864 a typographical error occurred by which illustrations 2 and 3 were transposed.

The American Automotive Product in the World's Trade

Automobiles, trucks and tractors built in the United States have reached their strongest point in overseas trade. Expanding and enlarging, the present movement shows no prospects of diminution, as more firms are entrenching themselves in the larger markets outside the domestic field.

THE American automotive industry has swung past the first quarter of the 1920 calendar year and is approaching the summer months with prospects of the greatest foreign sales in its history. Seemingly, the civilized world is curbing its purchases of the American output, particularly as regards passenger cars, only because of the limitations of production set up by the makers themselves. Exporters in the New York district—especially those companies already well established in the overseas trade—see no prospects for an early diminution of the outgoing shipments and they are overlooking no opportunity to keep up the rapidly moving flood of cars, trucks, tractors and other equipment to Europe, South America, Australia, South Africa, the Far East and other points of their wide trade range.

The exportations for the first quarter of 1920 have totaled 33,446 cars, with a total value of $36,234,054 and 7731 commercial cars, worth $11,817,140, in each case being an approximate one-half of the entire overseas shipments for the calendar year 1919. At the same rate of export, the year's outgo of cars would be some 133,784, almost doubling the year's business, and about 30,900 commercial vehicles. In 1919, the respective figures were 67,145 and 15,585, these being revised figures recently made public by the Bureau of Foreign and Domestic Commerce. But, in addition to these, as a part of the foreign automotive trade of the United States makers are the following:

	First quarter 1920	Calendar year 1919
Automotive parts and equipment	$21,129,148	$42,562,186
Motorcycles	2,748,740	.....
Gasoline engines	8,456,404	.....

In 1919, the American makers shipped to overseas buyers about 4.2 per cent of the 1,586,787 cars that came out of the factories and some 5.1 per cent of the 305,142 trucks. With probable actual construction in 1920 of 2,250,000 cars—the first quarter having seen about 500,000 come off the assembly lines—the same ratio of export would sell an approximate 95,000 for the foreign market. But more than a third of this number was shipped out of the country in the first three months, January, February and March, and every indication is that more than 100,000 American-made cars will be sent into the overseas markets during the present calendar year. Only extraordinary and unexpected conditions could prevent this volume of trade.

As for trucks, practically the same comparison may be used. Last year, the total American output came to 305,142 vehicles. The makers for 1920 have set their marks at some 400,000, but the probabilities are expressed that this will be pared down to about 370,000 when the actual count has been made at the close of the year. And thus, exporting at the same rate as in 1919, this year would send some 18,800 trucks to foreign purchasers. But the first quarter saw an approximate half of that number shipped and there can be little doubt that 20,000 and perhaps 25,000 will be chalked up as the total overseas trade for the year.

Volume of Trading

These optimistic figures will be attained because of two facts. The first is that the older companies, increasing their production, are, consequently, increasing the number of cars in their allotment for these markets. For months, most of the older and more firmly entrenched concerns have alloted a certain percentage of their output to export. The allotment for each company may have been set arbitrarily but it represented 10, 15 or perhaps 20 per cent of the production. This percentage has not been changed but, with production mounting as it has, more and more cars have been released for the overseas trade, all of which have been taken up so rapidly that many concerns have been forced farther into fixing arbitrarily the percentage of that allotment for distribution to each of the various countries. And there has been no hesitation of the various dealers in accepting whatever number of machines they might be able to obtain.

The second factor contributing to the expected increase has been an expansion in the actual number of exporting firms. Concerns which previously had made no attempt to get into the justly profitable markets of the world trade have entered this trade during the last few months. The needs of the buying world, in many instances, have forced them to institute a foreign sales policy. Intent upon work for domestic consumption or to meet the military need through the war period, such firms were attempting sales beyond the continental limits of the United States. But, returning to peace time industry after the armistice and with production enlarging from month to month, the opportunities arose for daring the wider foreign markets. For months, these concerns have been getting into the export field, some with small and some with large sales policies.

The Foreign Sales

To-day, few American makers, at least of cars, are without their export connections and without their export sales. Foreign newspapers and magazines bear out this statement perhaps with greater weight even than the claims of the companies themselves. Such papers, both popular and technical, are filled with advertisements of American automobiles, and dealers are crowding into New York and to the factory cities in an effort to make sales connections that will enable them

to meet some of the demands of their home countries.

It may be said that the American automobile is holding to-day the strongest position in the world's markets that it has ever attained. The larger and better established firms, utilizing the sales knowledge and the sales experience that has stood them so well in their home competition, are going after export business with intelligence and ability. They are developing it carefully. Potential outlets are being sought out and nursed along with the same wisdom that is being utilized at home. It is true that the older firms, particularly with their car sales, scarcely feel the need of sales campaigns; all they have to do to sell a car is to have it unloaded and put through the customs house. It is snapped up eagerly. Other concerns, especially those that went into the export markets in a haphazard manner or whose cars are not known, are finding that it is difficult business to make their foreign trade hold up.

Educational Campaign

In certain countries the people have first to be taught the use of the automobile and some firms are endeavoring wisely to do this, knowing that present effort will mean future strength in the territory under review. This is particularly necessary with trucks and tractors in some countries. As the truck has not reached its potential development in the United States, likewise in most parts of the foreign world its use has been backward and small. Some companies, realizing this, add to their selling campaign a greater one of education and feel assured that future business will reveal their wisdom. Numerous truck builders, as any export review will reveal, are pushing their foreign trade skilfully and carefully. Likewise, with tractors, some makers are virtually duplicating in South America and elsewhere the educational sales work that is now going on throughout the United States. One tractor concern, going into South America with the full determination of success, is perhaps expending more energy in education, both for itself and its prospective customers, than some of its competitors are in the markets at home.

The American automotive industry is strongly entrenched to-day in the foreign trade and there is every possibility that the volume of this business will reach new levels during 1920. The exchange flurries that threatened in February and March to cut down the export shipments have been overcome in great measure, especially so far as concerns the Anglo-Saxon-speaking territories, which have furnished, after all, the greatest outlet for our automotive exports. Those countries in which exchange is low have been indifferent buyers. Shipping conditions in regard to maritime transportation present few difficulties and cargo space is freely offered. European competition has scarcely developed and is more of a threat than an actuality. For the present, at least, it offers no drawback, although, of course, such competition may and probably will grow stronger from month to month.

European Competition

The American automotive product has become a familiar one of everyday acquaintance in all of the world's larger cities. True, in the foreign capitals and centers of population, one may see many pre-war cars of the European design that Great Britain, France, Italy and Germany sold so freely before the struggle broke out in 1914. Old and sometimes decrepit, these cars—they might almost be termed relics—have stood up in surprising fashion and many of them are yet performing valiant duty, although their lives should have ended long ago. But they remain, a promise of the day to come when the European makers again will be in production and again will be seeking the markets lost so long ago. In contrast, there are the newer cars of the American builders, many of them "just breaking into the society of international sales," and the few—but their number is pitifully small—that the continental factories have turned out since the war ended.

Great Britain has settled much of her labor troubles and her factories, slowly seeking out a pathway through the troublous times since the armistice, are adding painstakingly to their output day by day. The financial difficulties once so feared seem to be clearing and exchange on the pound sterling has climbed upward so far from its low point of February that the future seems more than assured for the Britisher. But the "all clear" cannot yet be sounded for the English automotive industry, as was pointed out recently by Frank Lanchester, president of the Society of Motor Manufacturers and Traders —the British National Automobile Chamber of Commerce. Output is growing, of that there can be no doubt, and the Englishman soon will be seeking again the markets of his colonial possessions and the other territories of his former export fields.

France has a potential production of some 200,000 cars a year, a figure that now seems far from realization. Her factories are battling against every kind of odds and the value of the franc has not ascended much above its lowest levels. But, as in England, production is increasing, not steadily, perhaps, but with ups and downs that seem finally to result in a greater output. The Italian makers, it is reported, are alloting certain percentages of their output for export, in one case about 50 per cent and in another one-third. This number is small, it is true; the Italian future is impossible of prediction, and, at best, her makers can hope to supply no more than a small fraction of the cars that are needed.

The Industry in Germany

Germany, of course, is in almost every kind of difficulty that could be imagined. It will perhaps be years before the industry there has regained its former markets. But the Germans are hopeful—of that there are some indications. One report, coming from a Belgian observer, spoke of 300 Benz cars awaiting shipment for India and newspaper reports have told of trucks being sold to Eastern and Southeastern European countries.

New York dealers have been hearing for several weeks of two German cars that had been sent to this country in the hope of finding dealer representation. Some time ago, anonymous communications went to several of the New York newspapers and press associations telling of a new German car that soon would be seen in the United States. Mechanical improvements were claimed for it, principally in connection with the clutch, and it was said that gasoline consumption had been reduced to a low point. The announcement was unsigned and undated, and no proof of its statements has been found. However, it does serve to indicate some of the methods that may be employed by the crafty German makers.

As was said previously, European competition at present is more of a threat than an actuality. The American automotive exporter who will devote his efforts to the sale of his own product rather than to fearing the continental output will be in the better position to meet it if it should come. A profitable overseas business cannot be based upon a few sales, although there may be many tempting opportunities for a quick turnover and a sudden profit. The exporter who seeks to obtain a strong market must undertake the work to get it. If that is accomplished during 1920, the starting hurdle will have been passed for the 1921 business.

The Individual Worker as the Keystone of the Labor Arch

Trade unionism is nothing more than a grouping of individuals and whatever action is taken by the union therefore must be mass action. Mr. Tipper points out how this feature of unionism has caused the neglect of the individual, who is, after all, the determining factor in any plant.

By Harry Tipper

ONE of the important reasons for the division of the councils in the trade unions and the unauthorized strikes which occur is the increasing tendency of the machinery of unionism to work slowly in arriving at a settlement with manufacturing bodies, and to increase the irritation of the workers by the length of time consumed in arriving at an agreement. In Great Britain, where the machinery of trade unionism is very much more highly organized and, consequently, more complex in its character, the difficulty has been of great importance, and has been one of the causes of the demand made for direct action by the radicals.

The same complaint is now being made in Great Britain with respect to the operation of the Whitley Councils, and it has been voiced in the meetings of the general workers who have been conferring upon the question of wage decisions. At this conference the general subject was the complaint among various classes of workers as to the slow and expensive methods of obtaining wage decisions under the Whitley Councils. Some alternate means of arriving at agreements were suggested, but they are not likely to improve the case. To add more machinery of organization, in order to speed up decisions which are delayed because of the existence of so much present machinery, does not appear to be a satisfactory method of attempting a solution of the difficulty.

In several notorious cases in Great Britain, the awards finally adopted by the employers and the unions involved were arrived at after such long delays that the workers had new grievances to present to the committee before the old decisions had been rendered. These difficulties have created a feeling of grave dissatisfaction among the workers in Great Britain and have concerned the leaders very much, without producing any sane plan for the settlement of these matters to supersede the present machinery.

We had a touch of this condition in the outlaw railroad strike which was partly caused by the impatience among the particular workmen over the delay in considering the demands they had made a number of months before.

It is always a matter of more time, more difficulty and the employment of more machinery of organization to provide agreements between large bodies of people than between smaller bodies. The machinery of trade unionism tends to become just as clumsy, inefficient and slow in its operations as any other official machinery which depends upon the counting of a lot of votes and the referendum to a large number of people. It has a tendency to become as bureaucratic as the Government itself, and the question of authority, of rule and precedent, of committee action and reference to the main body, hamper the negotiations, delay the settlements and increase the difficulties of the matter by the innumerable technicalities.

In some instances this condition has been notorious for a number of years, and it has been difficult to find a time in those fields when there were no strikes or disagreements with labor. Since the American Federation of Labor, the Railroad Brotherhoods and other labor organizations have grown to such an extent in size and in power they have been faced with the same difficulty that is being faced in Great Britain, although not yet to the same extent. However, it is to be expected that this difficulty will increase with the growth of labor organizations and the tendency for manufacturers to get together in similar organizations for their own protection.

Not only is this the case, but the individual worker who has been told that the demands voted by his union are being taken up and who waits for months without any definite report, feels that he is out of touch, that he is not informed and he becomes suspicious of his own leaders and their actions. Out of these difficulties, the demand has come in some unions for the limitation of the power of union executives and a return of more of that power to the general body of the union. The same feeling about political matters in some states led to the institution of the initiative and referendum. Unfortunately, this limitation of the power of the union executive only adds to the difficulty of arriving at a settlement, increases the length of time consumed by the negotiations, and makes the result of the endeavors of the committees more uncertain.

These difficulties, in fact, illustrate one of the fundamental weaknesses of the present organization machinery for settling even the disputes. The present methods are at all not capable of providing a basis for continued peace and they have a tendency to become incapable of providing a settlement of present difficulties.

The labor leaders, in fact, in the American Federation and the other large labor organizations are not in an enviable position. In order to settle promptly the difficulties and satisfy the rank and file of the union, they must have large powers delegated to them. The exercise of these powers leads to charges of autocracy and the difficulties are increased by these accusations. On the other hand, if they permit a curtailment of their powers so that the general body of the union is required to vote upon many matters, the time consumed by the negotiations is lengthened, the leaders cannot proceed without instructions and the results are more uncertain, because the final outcome depends so much upon the atmosphere of the con-

vention and the immediate discussion upon which the vote is taken. This fundamental difficulty with the trade union machinery is inherent and cannot be eliminated without destroying the democratic character or breaking up the union to some extent, by the unauthorized action of local bodies who cannot wait the general decision.

The unit of grievance is the individual. From the unit of grievance, the grievance grows until it becomes a general grievance among the same class of workers in the individual establishment. From there the grievance breeds until it becomes a local grievance in the community, and from that point it may be taken up until it assumes general proportions. Obviously, the place to satisfy the grievance is in the individual case. If there was sufficient feeling of confidence between the supervisors and the workers, in the individual departments of the factory, it would be possible to segregate the grievance of the individual worker and see that that grievance was eliminated or satisfied. If it cannot be determined at that point, it is obvious that the consideration should be given when it affects only an individual manufacturing establishment. When it reaches this point, it is usually possible to determine it.

The individual may hide his grievance and may not express it, but when the grievance becomes a matter of common understanding among the workers in a particular establishment, it has been the subject of discussion and has been sufficiently expressed, so that a reasonable amount of attention to the workers will indicate it. It is here that the most important work of settlement can be performed, and it is here that the contact with the worker, the understanding of his aims and the establishment of free and orderly methods of discussion reach their greatest value.

In some instances, like the railroad industry, matters have gotten to the stage where there is little possibility of establishing machinery of contact in various localities which will eliminate the danger of a general disagreement, and the only thing which can be done in this case is to understand the position of the unions, the difficulties of the labor leaders, the character of the labor organizations and to deal with them through their local and general bodies so that some mutual confidence is established and the smaller difficulties eliminated on that account.

In most industries, however, the character of the operations leads to their development into definite establishments concerned with one locality and faced with definite localized conditions. In these establishments the whole atmosphere lends itself to the development of organization contact between the management and the workers, which will permit the discussion of grievances, the education on any purpose and the establishment of the confidence that will aid the negotiations, eliminate a good many of the troubles which at present eventuate in strikes and confine the interruptions so that they are less disturbing and less difficult to handle.

The trouble is that we have been dealing with mass to such an extent that we have forgotten the individual and we are always looking to the general mass for improvements, which must come from the individual development.

I was speaking to a very successful business man the other day, who outlined to me a great scheme for the cooperative development of industrial organization within each particular establishment, one that, in his mind, would make all the workers participate in incentive and in an agreement of purpose for the development of the institution. He wound up his statement of the matter, however, by saying that if we had a real government, Congress would see that such systems were adopted.

I asked him why he did not put it in his individual establishment. His reply was that there was no use for him to do that individually because that would not help matters; he would still have to fight the unions and it would put him under a competitive disadvantage with other establishments. He did not seem to recognize the impossibility of Congress doing anything, unless public opinion had been so thoroughly educated by the actions of a number of individuals, that the pressure upon Congress made it uncertain.

This is not an isolated case. We all wait for the mass to act, forgetting that the mass only acts when the leaders have educated a sufficient number of individuals, one after the other, so that this individual pressure causes the mass to demand action. So long as we use this mass machinery or organization with the idea that we can force settlements upon the individual and continue to do so, so long will we have unrest to the point where the unions themselves are divided and disagreement among manufacturers to a point where they cannot act entirely in unison. We shall have the resulting confusion with respect of all labor matters.

What Does Labor Want?

IN addressing the New York Business Publishers' Association, recently, Samuel Gompers outlined in a broad way the chief aspirations and aims of the American labor movement.

"As wage earners," he said, "we have aspirations and hope for a better life and for, if you will, a better time. Sometimes, perhaps, we are idealistic and theoretical, but in the last analysis our aspirations are for better life work and for home standards such as all Americans have the right to expect."

This will be brought about, the speaker said, by a work day not in excess of 8 hr., by a minimum wage scale "under which no American can be expected to live," and by the workers' right to be represented "by the counsel he himself selects" in determining his status. Labor "does not want to take over industry, but to have a voice in those things affecting it," and it does not "aspire to dominating absolutism" in conducting it. The labor market of to-day is a "buyer's market," in which the purchaser and not the seller—in this case, the worker—fixes the rate to be paid. Industry shall be conducted along ideals that are patriotically American, with the Federation of Labor, and "not by a new movement in which Americanism and patriotism" have no part.

Whatever may be said or thought about Mr. Gompers and the American Federation of Labor, and however great may have been the "inconveniences caused by small groups," he was setting forth the ideals of his organization according to the best thought of the labor movement, and uttering a warning that harsher and more radical bodies might rise upon the ashes of a defeated American Federation of Labor. From that standpoint Mr. Gompers' remarks deserve the serious attention of all employers of labor.

AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

PUBLISHED WEEKLY
Copyright 1920 by The Class Journal Co.

Vol. XLII Thursday, May 6, 1920 No. 19

THE CLASS JOURNAL COMPANY
Horace M. Swetland, President
W. I. Ralph, Vice-President E. M. Corey, Treasurer
A. B. Swetland, General Manager
U. P. C. Building, 239 West 39th Street, New York City

BUSINESS DEPARTMENT
Harry Tipper, Manager

EDITORIAL
David Beecroft, Directing Editor
Ray W. Sherman, Executive Editor
Clyde Jennings, Managing Editor
P. M. Heldt
George E. Quisenberry

DETROIT OFFICE
J. Edward Schipper

WASHINGTON OFFICE
816 Fifteenth St., N. W.

BRANCH OFFICES
Chicago—Mallers Bldg., 59 East Madison St., Phone Randolph 6960
Detroit—95 Fort Street, West, Phone Main 1351
Cleveland—Guardian Bldg., Phone Main 1142
Philadelphia—Widener Bldg., Phone Locust 342

Cable Address - Autoland, New York
Long Distance Telephone - 8760 Bryant, New York

SUBSCRIPTION RATES
United States and Mexico - One Year, $3.00
Extra postage west of the Mississippi River on account of Zone Postage Law, 0.50
Canada - One Year, 5.00
Foreign Countries - One Year, 6.00

To Subscribers—Do not send money by ordinary mail. Remit by Draft, Post-Office or Express Money Order or Register your letter.

Owned by United Publishers Corporation, Address 239 West 39th St., New York; H. M. Swetland, President; Charles G. Phillips, Vice-President; W. H. Taylor, Treasurer; A. C. Pearson, Secretary.

Entered as second-class matter Jan. 2, 1903, at the post-office at New York, New York, under the Act of March 3, 1879.

Member of Associated Business Papers, Inc.

Member of the Audit Bureau of Circulations.

Automotive Industries—The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly), May, 1902, Dealer and Repairman (monthly), October, 1903, and the Automobile Magazine (monthly), July, 1907, and The Horseless Age (semi-monthly) May, 1918.

Banks and Automobile Paper

THE action of the Federal Reserve Bank of Kansas City in declining to continue the discounting of automobile dealer paper will come as a surprise to the industry. It will be difficult within the industry to understand why paper that has proven such an excellent medium of financial trade should be placed outside the pale. For several years banks have accepted automobile dealers' paper without question and the business has been built up on this theory of financing.

The industry has regarded the automobile as being well established in the big trade of the country. There was no suspicion among manufacturers and dealers that the passenger car was not entirely established as a utility and a business unit, and that the paper arising from this trade would not be as acceptable to the financiers at all times as the paper of any other well-established industry.

The Federal Reserve Board has said that this action was individual to the Kansas City bank and that it was not the province of the Board to determine questions of this kind. It also is stated that this action need not influence the acceptance of automobile paper by member banks. Apparently, the situation is one that should appeal to both dealers and manufacturers in looking into their own sources of credit and keeping their own bankers in line on the industry.

The Employment Manager

THE industrial neophyte is inevitably impressed upon visiting any large modern manufacturing plant with the intricacies and capabilities of all the various types of machinery. He looks almost with awe upon the technical man who knows not only the names of all the different parts and understands each of the various operations, but also the reasons for them and the principle underlying their development. Yet it is perfectly possible for one man through thorough study and practical experience to completely understand at least a limited number of machines. No man, however, since the beginning of time, has ever dared to pretend that he understood thoroughly that most complicated of all machines, the human being.

It is remarkable, consequently, that manufacturers who demand trained and experienced men to establish and operate their engineering and production departments are satisfied to place in the care of an untrained man the important and difficult task of employment management or personnel administration. A man was made employment manager in one firm because he had lost an arm in an industrial accident and was unable to do work of any other kind. Another firm apparently considered that experience as a member of the plant fire department force was conducive to a thorough knowledge of human nature and a comprehensive grasp of the intricate problems of industrial relationships.

The extremely high cost of labor turnover alone would seem to dictate the necessity for a high-grade man to handle employment or personnel work. Added to this, however, the ability of such a man to see the problems clearly in the first place and then to devise and execute constructive means for solving them seems to be another very practical financial reason for not entrusting this work to a low-grade, narrow-visioned man. This organization task more than any other demands a broad vision, a wide experience, and a thorough knowledge of the fundamental principles of economic, engineering, and human nature.

Standardizing Truck Control

IN this era of high prices, everything that can be done to bring down the cost of a product should be carefully considered. There are two ways in which prices may be lowered. One is by better manufacturing methods; the other is by standardization, allowing for quantity production with a minimum of tooling up and handling.

Manufacturers of truck bodies are agreed that something should be done in the way of standardizing the control units on truck chassis so they might make

their bodies at a lower cost. There are many things about the truck that seem to lend themselves to standardization for definite capacities. A few of these would possibly include the width of the chassis frame, location of control levers, location of gasoline tanks, location of batteries, location of tool box, location of steering wheel, length for driver's seat or cab from dashboard to back of seat measured from outside to outside and, possibly, a few other points that do not affect carrying capacity or in any way interfere with originality.

The fact that a body builder is absolutely tied up until he has definite orders for definite bodies is a detriment to the body manufacturing business. It stands in the way of lower body production costs and, consequently, is one of the factors compelling the ultimate consumer to pay more for his truck. If standardization of certain units on the truck chassis for definite capacities could be arranged, it certainly would be worth while from the body maker's standpoint.

Feathering Your Own Nest

AN executive of a large automobile concern, in discussing the question of industrial relations, said recently: "Frankly, I am not much interested in helping writers or investigators in their attempt to solve the labor problem of the automotive industry. We are content here to build our own little nest and feather it in the best way we know how."

Although an attempt to handle industrial relations in this way may be made in the best of faith, the bare facts of modern industrial organization will prevent it from being carried out successfully. There is inevitably a definite relation between the labor situation in one plant and the labor situation in another near to it. In a like manner, plants of one vicinity are affected by labor conditions and movements throughout the industry.

This fact is illustrated by an incident proved recently by the sales manager of a New England crankshaft manufacturing concern. He had been endeavoring for over a year to sell to a certain automobile concern but had been unable to do so because his price was slightly higher than that of his competitors. Believing, however, that his method of manufacture and the workmanship of his employees produced a finer quality crankshaft than that of his competitors, he did not attempt to make the sale on a price basis. A few weeks ago he received a hurried telephone call from the automobile manufacturer. The manufacturer said: "I must have some crankshafts. The firm from which I have been buying has a strike on and there seems to be little prospect of settling it. We are up against it; can you help me out?" The sale was made.

The story illustrates vividly the importance to every manufacturer of the industrial relations methods used in plants with which he is doing business. This automobile manufacturer was directly concerned with the fact that the firm from whom he had been buying crankshafts had been unable to continue its production on account of a strike. He was, too, directly concerned with the fact that the second plant had developed a system of industrial relations which insured continuous production even in troubled times. Industrial relations must be viewed in perspective. No manufacturer can afford to view any single labor disturbance as a unit in itself. He must see each single incident as a part of the great whole; he must see conditions in his own plant in their relation to industrial relations in general. It is impossible for a manufacturer successfully to "build his own nest and feather it" without reference to the general aspects of labor conditions.

Airplane Engineering

THE development of the airplane, in some respects at least, may be likened to the development of the automobile. Each has gotten under way slowly at first and each has had to fight against public opinion to obtain the proper recognition of its merits as a service arm of transportation. The automobile, in the beginning, was considered as being of value for sport only and, likewise, the airplane has been thought of almost entirely as a vehicle offering only novelty and adventure in its use.

But, in another and perhaps more important manner, may the two be likened. There was a time in the development of the automobile when everything was done behind closed doors, when engineers and designers considered their problems in secrecy and when current practice and future plans were revealed only under the spur of necessity. Companies and designers seemed to hold a professional jealousy and the man who had an idea guarded it with every possible precaution.

But that feeling has almost passed. The Society of Automotive Engineers, as one factor, and the widening scope of the industry itself so changed that attitude that common and frank discussions of problems are today more the rule than the exception. As a result, when a problem arises there is a great body of men who are ready and anxious to undertake its solution—and as a result the entire industry advances and grows stronger.

The airplane has not yet reached such a point. Secrecy of design and secrecy of knowledge is held as tenaciously as possible. Each factory and each designer works out his own problems and frequently the results become known only through chance and accident. Perhaps this is a necessary stage and one that will pass away, just as it has to a large extent in automobile construction.

An Automotive Orator

THE automotive industry is to be congratulated upon the selection of its spokesman at the meeting of the Chamber of Commerce of the United States at Atlantic City last week. George M. Graham presented the case of the truck as a transportation factor in excellent manner and as an orator Mr. Graham compared favorably with the spokesmen for other lines of business, and, indeed, with many of the professional orators who were on the program.

Railroad Priority on Raw Steel

Allotment for Passenger Cars May Be Reduced 50 Per Cent

Manufacturers Recognize Importance of Restoring Efficiency of Systems—Believe Other Industries Should Make Similar Sacrifices—Truck Building Not to Be Affected

NEW YORK, MAY 3.—Reports from authoritative sources indicate that the manufacturers of steel are about to divert to the manufacture of railroad equipment a large part of the raw steel now used in making passenger automobiles. It is hinted that the proposal has been "sympathetically received" by some of the large automobile manufacturers. The program is based on the contention that a large proportion of the passenger cars made are "non-essential." The extent to which production of "pleasure cars" would be curtailed is understood to have been set tentatively at 50 per cent.

The figures behind this movement are as elusive as a legislative lobby. Its purpose is not difficult to find, however. The railroads, recently returned to private ownership, are in a sorry plight. They are short of funds; they are short of motive power and equipment of all kinds; they are short of some of the most essential kinds of labor.

When the railroads went into the market for locomotives and freight cars and passenger cars they found on the books of the steel mills an enormous number of unfilled orders. If the railroads were not to be given priority it would be months before they could expect to get steel to fill the needs they contended were imperative if the transportation system of the country were not to break down completely.

The Association of Railway Executives, composed of the presidents of all the systems in the country, will not admit it has taken the lead in asking the steel makers to divert steel from the automobile factories to engine and car builders. It is admitted, however, that such a movement is under way, although the positive assertion is made that the roads are not a party to it. The initiative is laid at the doors of the steel manufacturers to whom are imputed the most patriotic of motives. It is contended that unless the railroads are built up the whole system of production will collapse because of lack of transportation.

United States Steel Evasive

When the question of what action was contemplated was taken to the office of Judge Elbert H. Gary, chairman of the board of the United States Steel Corporation, it was referred to James A. Farrell, president of the corporation, who is in charge of sales. At the office of Mr. Farrell a glowing tribute was paid to the automobile industry. It was pointed out that it was the first to revert from a war to a peace footing and that it did more than any other to stabilize labor when the country was tottering in an industrial way after the signing of the armistice.

It was significant, however, that an evasive answer was given when this question was asked:

"Can it be said, then, that the United States Steel Corporation is not contemplating the diversion of steel from automobile factories to the railroads?"

At the office of Charles M. Schwab, chairman of the board of the Bethlehem Steel Corporation, the question was referred to President Grace at Bethlehem.

Won't Stop Truck Steel

It has been learned, nevertheless, that all manufacturers of steel and iron will divert steel from automobiles to the railroads. There is no intention to cut off supplies from trucks and tractors which are considered essential to production and transportation. Even the railroads profess to welcome the use of trucks for short hauls.

Any intention to discriminate against automobiles is denied. It is asserted that other industries will be called upon to make sacrifices, but it is pointed out that passenger car manufacturers will be hit hardest because they are using tremendous quantities of steel.

Even before the outlaw railroad strike steel production was running at little more than 70 per cent of normal and this has been materially reduced by the strike. Transportation difficulties have resulted in a piling up in warehouses of the finished product. About the only way in which shipments can be made is by means of through trains which require little switching.

Alfred Reeves, general manager of the National Automobile Chamber of Commerce, strongly questioned whether any attempt would be made to discriminate against the automobile industry. The general policy of the chamber is based on broad, patriotic, constructive lines. It recognizes the needs of the railroads and believes they should be met. It is perfectly willing to make sacrifices to help meet them. It would have no objection to giving up a part of the steel it needs if other industries would do the same. It does not intend, however, to be made the country's industrial "goat." It does not concede that passenger cars can be classed as "pleasure vehicles." It knows that 80 per cent of the total passenger car mileage is for business purposes. It is confident of its own strength and does not propose to be discriminated against unjustly.

No Question of Railroad Needs

There is no disposition anywhere to question the needs of the railroads or the necessity of putting them on their feet. While production in all lines has been increasing at an unprecedented rate, railroad equipment has not been increased at all and the efficiency of what they have has been very materially reduced. The additions made during Government control were negligible. The Association of Railway Executives has fixed as the irreducible minimum of new equipment for this year 100,000 freight cars, 3000 passenger cars, 1000 baggage and express cars and 2000 locomotives. This is less than the normal building requirements for a year before the war. Great difficulty will be experienced in financing even this amount of rolling stock.

The equipment now in use is wearing out and has to make frequent trips to the repair shops. A large amount of it is constantly tied up in this way. Every time a car goes to the shops it takes longer to repair it than it did three years ago. Ten men are being employed to do the work six used to do. Difficulty is being experienced in finding labor for the shops and maintenance of way. It is held that if there was a slackening of activities in automobile plants many of the men now employed in them could be used in necessary railroad work.

Credit Lines Under Strain

Without credit industry cannot exist and seldom in the history of the country have credit lines been strained as they are to-day. The Federal Reserve Board has been preaching to its member banks for months the necessity of extending credit to the enterprises most essential to the general welfare of the nation. Credit for speculative purposes has been frowned upon. Rediscount rates have been raised to keep it in check. It is

(*Continued on page* 1077)

Will Affect Automobile Production

Serious Handicap Not Anticipated

Officials Express Confidence in Ability to Keep Moving in Rebuilding Period

DETROIT, May 2—Factory officials, admitting truth of the report that steel manufacturers would divert their product to the railroads at the expense of the automobile factories, expressed no fear that any serious handicap to the industry would result. Evidence of their confidence of being able to weather the storm is shown in their apparent indorsement of the plan in the hope of bringing about a quick rehabilitation of the wrecked railroad systems.

The proverbial silver lining is pointed out, however, in the fact that it will be a physical impossibility for the railroads to consume the entire output of steel and the overproduction, they contend, naturally will fall to them.

H. H. Rice of General Motors Corp. declared the fact that there has been no financing program announced by any of the railroads save the New York Central and Pennsylvania precluded the possibility of the railroads consuming the output of the steel mills. In the first place, said Rice, granted they were able financially to handle the entire production, there is not sufficient railroad tonnage available to move it. The fact that only the lighter steel is demanded by the automobile industry, he said, would prevent any serious hardship.

F. J. Haynes, general manager of Dodge Bros., declared that it was right and proper that the automobile industry and every other user of steel should stand by and allow the wrecked transportation systems of the country to be rebuilt. He too, however, sounded the saving clause in stressing the point that the diversion would affect only the mills producing bar billets and sheet slabs and the heavier types needed for railroads. That of course would have its effect on the mills which supply the lighter steel used in automobile manufacturing, he said, but he declared it would not be sufficient to cripple the factories.

Willing to Make Sacrifices

He would not say he had been informed officially of the diversion plan but said it had been discussed and his company, in common with most of the larger plants, was willing to make what sacrifice was necessary to aid restoration of the transportation system.

J. H. Main of the Cadillac Motor Car Co. said the report was authentic but he too declared that the mills that make steel suitable for the railroads do not make automobile steel, excepting that they supply the heavier billets to other mills for rerolling in cases where the mills supplying the automobile industry do not produce their own steel. In mills not dependent on the producers of the heavy bar billets and slabs, he said, the automobile supply source would be undisturbed. He said the effect would be felt to a considerable extent but not sufficiently to compel a shut-down.

President W. C. Durant of General Motors was too busy in conference to discuss the matter and Rice made the statement for the company.

Railroads to Get Steel

(*Continued from page* 1076)

held that there is no more than enough credit for essentials and that non-essentials must suffer in consequence. The railroads are classed as most essential.

Except in the case of the Kansas City Bank, the Federal Reserve Board has placed restrictions on automobile paper only as it relates to cars in warehouses. The unfortunate effect of the situation will be the psychological result of a general attempt to class automobiles as non-essentials. Bankers in Portland, Me., and Portland, Ore., will unconscionably scan automobile paper more closely because of the stand taken in Kansas City.

Advices from other Federal Reserve districts show that the Kansas City bank has acted independently, exercising the discretionary powers vested in it by law. There is no indication of an attempt to take similar action in New York or other centers. It is admitted, however, that the credit situation is strained.

There is no disposition in any quarter to minimize the seriousness of the situation. The next four months will be difficult for the banks but they will be only a preliminary to the strain which will come in the fall. Tight money is expected and the main question is whether it will be so tight as to force the sale of commodities and securities. The banks now are in strong enough position to control the situation.

WOULD REDUCE CAR SHORTAGE

WASHINGTON, May 1—Chairman Clark of the Interstate Commerce Commission to-day requested R. H. Aishton, president of the American Railroad Association, and Guy M. Freer, executive secretary of the National Industrial Traffic League, to appoint committees from their respective organizations to meet as a joint committee to devise means of reducing car shortage.

Chairman Clark also addressed a notice to all carriers and shippers asserting that individual and concerted action was needed for prompt restoration of better operating conditions and that only the greatest efficiency in transportation could prevent widespread economic loss.

Motor Truck Future Brightest in Trade

Trip Through Factories by N. A. C. C. Official Shows Great Expansion Plans

NEW YORK, May 4—More enthusiastic than ever over the future of the motor truck, F. W. Fenn, manager of the truck division of the National Automobile Chamber of Commerce, has returned from a two weeks' trip through the factories in four States. He fairly radiates optimism but declares he is no more confident than the manufacturers themselves. All of them are ready for the expansion they believe is inevitable if production is to keep pace with demands. Nearly all of them have vacant ground adjacent to their plants upon which to build additional units.

While Fenn sees no limit to the future possibilities of any branch of the automotive industry, he firmly believes the greatest expansion will be in truck making. One reason is the development and expansion of highway transport and the nation-wide demand for good roads. Production will have to expand rapidly to keep pace with the demands of commerce. The industry is built on a solid basis.

Almost without exception manufacturers reported a greater demand for trucks than they could meet. The trend of big merchants to abandon horses and take up trucks for deliveries and haulage of all kinds is described as remarkable. The most recent example is the Southern Wholesale Grocers Association which has decided to urge all its members to turn to trucks.

One of the most gratifying features of the truck business is that by far the larger part of it is a cash business. This is particularly true of large houses.

While absent from his office here, Fenn visited factories in Syracuse, Rochester, Buffalo, Detroit, Pontiac, Jackson, Lansing, Grand Rapids, Alma, Chicago, Milwaukee and Hartford, Wis. Most of the factories were closed because of the switchmen's strike.

Carried Parts in Suit Cases

All kinds of expedients were resorted to in an effort to get essential parts. The International Harvester Co. sent men to its parts plant at Akron to bring back parts packed in suit cases. Republic and Federal plants were closed flat. Kissel was running because it had on hand a large supply of parts. The railroad jam is just beginning to straighten itself out, for many thousands of loaded freight cars had accumulated on the tracks. As a consequence all factories are driving their trucks away as the only means of getting deliveries.

Wheat Congestion Responsible for Western Money Scarcity

Kansas City Dealers Agree to Co-operate With Banks in Working Toward Relief From Situation—Will Restrict Sales for Present

KANSAS CITY, May 4—The Kansas City Motor Car Dealers Association has given recognition to the congestion in the movement of wheat which has tied up large sums in the banks. Because of this situation there is a shortage of loanable funds and the necessity for a temporary restriction of loans to all business except agriculture has been admitted by the automobile men as a patriotic duty.

The dealers will co-operate with the banks to bring about an early return of the usual banking facilities by seeking minimum accommodations now and restricting retail sales to the persons best able to afford passenger cars.

Bankers who attended a meeting of the dealers Monday night said the banks did not intend to establish a precedent of barring automobile paper but that all available funds were needed now to finance farmers and that the co-operation of motor car dealers was needed at this juncture. The following statement was read from J. E. Miller, governor of the Kansas City Federal Reserve Bank:

"The Federal Reserve Bank of Kansas City has not requested and will not request its member banks to discontinue loans to the automobile industry or to call such loans. Our executive committee is, however, scrutinizing very closely all paper presented for discount and accepting only such as it deems desirable at this time."

It was emphasized that no formal order has been issued as to motor paper and that such paper may be desirable, perhaps in a week and perhaps not in two months or more. The dealers have taken the position that they will do their part for whatever period is necessary, as other less conspicuous interests are doing.

Bank Attitude More Liberal

The attitude of the Reserve bank as outlined by Miller was more liberal than the position taken by C. A. Worthington, deputy governor, who said two or three days earlier:

"Whether automobile paper will be taken again in any large volume for rediscounting depends entirely on whether other uses for the available funds, uses which we consider more essential, are cared for adequately."

Much of the demand for money originates in the small country banks which finance the farmer in purchases of equipment, seed and supplies. Federal reserve officials have been urging consistently the necessity of increasing production in this territory and this applies chiefly in this district to agriculture. They also have urged that manufacturers should encourage production of raw materials even if it became necessary to curtail production of the finished product. For that reason it has been held necessary to give financial support to the farmers if they were not to cut down their acreage.

Another danger was foreseen in the fact that so much money was being borrowed for speculative purposes. It was felt that unless this tendency was curbed interest rates would go so high the farmer could not or would not borrow. To this end the Federal Reserve Bank raised its rediscount rate but the borrowing continued.

Allot Loans to Members

A sliding scale of discount rates was fixed. Each member bank has a certain amount of credit at the normal rate. When the bank wants additional credit it must pay a higher rate. This is one-half of 1 per cent additional on an amount equal to one-fourth of the basic amount and an additional one-half of 1 per cent on each additional equivalent of 25 per cent of the basic amount.

The necessities of holding securities which the Federal Reserve Bank will recognize is having a marked effect on passenger car purchases. Motor car dealers admit that 75 per cent of the passenger cars sold here are bought on time. Bankers contend the percentage will run as high as 90. Heretofore a business man could borrow money from his banker to pay for a car if he couldn't get accommodation from his dealer or a securities company. Now the banker insists on knowing what the business man is going to do with the money. If the purpose is to buy a passenger car the loan frequently is refused, even if Government bonds are offered as security. It must be said, however, that this rigid scrutiny is not confined to automobiles. It extends to anything which the banker thinks the business man can reasonably do without.

Banks Face Tight Money Situation

NEW YORK, May 3—Vigorous protest against the action of the Kansas City Federal Reserve Bank in refusing to rediscount automobile paper has been taken by the National Automobile Chamber of Commerce. As soon as its attention was called to the discrimination against the industry, this telegram was sent to the bank:

"We feel ruling made by you against rediscounting of paper on automobiles fails to give proper consideration to economic importance of industry. We assume you made no attempt to discriminate against business of other industries. Motor car industry is absolutely essential and diversion of man power theoretical and impractical. Attitude your bank has assumed harmful to industry and we trust may be reconsidered. Kindly advise."

When no reply to this message had been received by Saturday a letter was sent to the bank to follow up the telegram and present arguments against the action taken.

High Interest Rate Hurts Bond Sales

DETROIT, April 30—Road building in Michigan may be seriously handicapped as a result of the high interest rates now prevailing, and which makes the sales of Michigan road bonds at the legal 5 per cent rate almost impossible. Despite the fact that the voters of the state authorized the expenditure of $50,000,000 for road work in the state it becomes increasingly evident, according to Commissioner Frank Rogers, that the Legislature must increase the interest rate or allow the highways to remain as they are.

In an effort to dispose of the bonds the 4½ per cent rate offered was raised to 5 per cent, the present legal limit, but even this rate appears to hold but slight attraction for investors in this day of soaring interest rates.

Less than one-quarter of a million of the bonds were sold and the remainder of the first five million issue was placed in banks. The bonds are quoted under par in New York, and only action by the Legislature in changing the maximum rate can save the situation in the opinion of road men and financial experts.

Rising Costs Make Higher Prices Likely

DETROIT, May 3—Steadily mounting costs of production are likely to result in an increase of prices for passenger cars and trucks within the next two months. Costs of parts and materials are rising steadily and the end is not in sight. Manufacturer have compiled detailed cost estimates based on future receipts of materials and in most instances these figures are said to have made a price increase inevitable.

GRANULITE BED DISCOVERED

LONDON, April 15—(*Special Correspondence*)—According to the American Chamber of Commerce in London, an important discovery of granulite, a material of the first importance in the manufacture of glass, has been made on the northern borders of Dartmoor, near Okehampton.

Granulite contains not only silica, but potash, soda and alumina, all of which are necessary in glass making, and gives the best results in the production of glass ware of the highest quality. A company has been formed to develop the property.

N. A. D. A. Protests Credit Refusal

Urges Harding to Consider National Effect of Action of Kansas City Reserve

ST. LOUIS, May 1—The National Automobile Dealers Association has sent telegrams to W. P. G. Harding, governor of the Federal Reserve Board, and J. Z. Miller, governor of the Kansas City Federal Reserve Bank protesting against the refusal of the Kansas City institution to rediscount automobile paper. The message to Miller follows:

"Behalf automobile dealer industry respectfully protest refusal Kansas City Reserve Bank rediscount automobile paper. Action creates a policy which if followed by all reserve banks would result in stagnation in automobile industry and might precipitate national financial disorders of utmost magnitude. Believe automobile dealer paper represents highest type security. Industry employs nearly million men. Five million persons dependent upon them for livelihood. Nearly $2,000,000,000 of capital engaged in manufacturing and selling. Nearly $1,000,000,000 a year paid in wages. On behalf of 35,000 dealers of nation we respectfully urge reconsideration of course projected."

The telegram to Harding was identical except for the last sentence, which said:

"Will you please give matter your personal attention and make decision from national viewpoint as better comprehending broader policies concerned than Kansas City is able to apply."

It is the belief here that the Kansas City order is the result of a local condition resulting from the large amount of credit extended to dealers. While St. Louis and Kansas City probably do about the same amount of automobile selling, the amount of credit in Kansas City is much larger than in St. Louis. The average of time payment sales in Kansas City requires about 12 months to close, while here the average is only about half that length of time.

One of the largest dealers in St. Louis conferred with his banker last week on the credit situation and was told that in planning his 1920 financing he could count on as much credit as he had last year. His loans will average $250,000 a year.

USE DRIVE-AWAYS FOR FREIGHT

DETROIT, May 1 — A plan to relieve, in a measure, the congestion in freight, as a result of the railway strike, and assist shipper and consumer, has been suggested by J. T. Ross, traffic commissioner of the Chamber of Commerce, who urges the loading of drive-away fleets. It is his contention that a great volume of goods could be moved out of Detroit to drive-away destinations, loading the cars so lightly as to not cause a strain.

The plan appears feasible and is being given serious consideration by factory executives and dealers. With several hundred cars leaving Detroit and vicinity every day thousands of pounds of goods could be shipped to Ohio points, Chicago, Louisville, New York, Philadelphia and, in fact, to cities from 200 to 1000 miles in almost every direction. Hundreds of cars from Flint, Pontiac and Lansing, and scores of trucks pass through Detroit every day, and also could be utilized in hauling freight.

Stevenson to Build $1,000,000 Gear Plant

INDIANAPOLIS, April 30—The Stevenson Gear Co. has announced that it will take immediate steps toward the erection of a $1,000,000 plant in this city to cut commercial gears by the patented Stevenson multiple process. The plant will be constructed to house in the neighborhood of sixty complete gear cutting units and is expected to employ from 300 to 400 men within a short time.

The Stevenson multiple shaper gear cutting machines are the joint invention of George E. Stevenson and his son George R. Stevenson. Up to this time, according to their statement, the method of generating gear teeth has been to cut them one tooth at a time. In most instances, the Stevenson multiple shapers cut all the teeth simultaneously, thereby reducing the cost of manufacture in exact proportion to the number of teeth involved.

Indianapolis was selected as the site for the company because of its central location, and the large number of automobile manufacturers included within a radius of 300 miles. Not only the automobile industry, however, but manufacturers of all classes of machinery in which gears are used, will be large consumers of the output of the company. The officers of the company are Thomas J. Stevenson, president; George R. Stevenson, vice-president; George E. Stevenson, secretary and general manager, and Elmer D. Johns, treasurer.

British Syndicate Buys Slough Works

Government Disposes of Reconditioning Plant and War Vehicles for £7,000,000

LONDON, April 10 (*Special Correspondence*)—The motor transport repair depot at Slough, built and operated by the British Government for the reconditioning of British automotive vehicles used in the war, has been sold by the Ministry of Munitions to a British syndicate for £3,350,000, a profit over the original construction cost of £850,000. The syndicate, which is said to be all-British, will be announced later.

In addition to the works and equipment the syndicate has further purchased the whole of the motor transport and spare parts remaining unsold in this country and abroad for a minimum sum of £3,650,000, this amount to be increased proportionately according to the sale price realized on the resale of the vehicles.

When the offer was first made it was reported that Henry Ford and J. Pierpont Morgan were supporting the deal with American capital, but this has since been denied. Sam Wallace, who reorganized the plant and has been in charge of the work there for some time, is believed to be identified with the syndicate, his continued residence in England for some years bringing him within the termination all-British.

Wallace recently visited the United States and at the time it was said his visit was to interest Ford and others in the purchase of the Slough works. Sir P. D. Perry, formerly chief of the Ford interests in Great Britain, is also reported to be prominent in the personnel of the new syndicate. How the works will be utilized with the completion of the reconditioning work on the war vehicles will remain a matter of conjecture for the present.

The Cairo to Cape Air Flight

This picture shows Colonel van Ryneveld, with his aide, Captain Brand, signing autographs at Johannesburg, South Africa

March Car Exports Highest Since War

Total of $34,496,482 Gains $8,000,000 Over February—Britain Biggest Buyer

WASHINGTON, May 1—The foreign trade of the American automotive industry reached a level for March greatly in excess of any previous month. Totals just made public by the Bureau of Foreign and Domestic Commerce show that the figure for March, excluding tires but including cars, trucks, airplanes, automotive equipment and gas engines, was $34,496,482. The volume in February reached $26,207,059.

Details of this record are listed in the accompanying tables. They show the overseas shipments of passenger cars jumped to 14,355, valued at $15,782,532, an increase of more than $4,000,000 over February and almost four times the figure for March, 1919. Truck sales climbed to $4,958,816 from the record of $4,130,468 in February; parts from $7,207,366 in February to $9,143,156 in March; motorcycles from $920,403 to $1,164,049; gas engines from $2,293,706 to $3,648,146, and airplanes and airplane parts from $50,494 to $159,783.

Great Britain and the English-speaking countries of the world were most active in adding up this large volume. As in February, the greatest single purchaser was Great Britain, with 2220 passenger cars, the shipment going for the first time over the $2,000,000 mark in value, and 410 commercial cars with $723,433. The total sales to Great Britain for cars and trucks, excluding all other equipment, was something more than $3,500,000.

Exports of Automobiles, Airplanes, Trucks, Tractors, Motorcycles and Parts

	March				Nine Months Ending March			
	1919		1920		1919		1920	
	No.	Dollars	No.	Dollars	No.	Dollars	No.	Dollars
Airplanes	....	....	....	....	43	577,600	39	206,480
Airplane parts	....	639,858	....	159,788	....	10,186,099	....	381,543
Commercial cars	1,233	3,153,389	3,121	4,598,816	8,954	24,460,994	15,795	28,284,736
Motorcycles	1,198	327,609	4,285	1,164,049	6,737	1,630,242	24,099	6,597,843
Passenger cars	3,445	4,172,126	14,355	15,782,532	22,968	26,506,098	73,779	79,911,008
Parts (engines and tires not included)	....	2,527,620	....	9,143,156	....	24,978,866	....	43,687,741

Exports of Engines

	March				Nine Months Ending March			
	1919		1920		1919		1920	
	No.	Dollars	No.	Dollars	No.	Dollars	No.	Dollars
Automobile, gaso	1,445	244,044	4,423	675,171	17,199	2,714,840	28,605	4,309,261
Marine, gaso	1,119	552,055	1,076	323,841	4,903	2,654,503	6,965	2,481,931
Stationary, gaso	1,631	258,408	2,508	527,876	16,784	2,421,445	19,975	2,933,092
Tractor, gaso	935	993,908	2,220	2,121,258	15,503	17,163,844	13,766	12,497,758
Totals	5,130	2,048,415	10,227	3,648,146	54,389	24,954,632	69,311	22,222,022

Exports by Countries for Month of March

	1919				1920			
	Passenger		Commercial		Passenger		Commercial	
	No.	Value	No.	Value	No.	Value	No.	Value
Denmark	15	$30,184	27	$27,125	157	$182,180	54	$116,201
France	73	170,893	477	2,000,002	63	116,702	30	116,218
Norway	21	50,383	37	92,526	181	192,460	73	151,348
Peru	14	20,880	....	....	130	88,671	....	....
Spain	62	94,053	....	....	240	208,762	....	....
United Kingdom	35	43,835	11	21,347	2,220	2,666,538	576	842,344
Canada	405	430,102	90	116,813	1,142	1,452698	294	529,520
Mexico	199	178,922	29	65,166	217	183,760	95	122,696
Cuba	151	171,431	61	103,121	287	304,343	143	379,487
Argentine	206	223,005	7	9,675	688	728,223	58	88,585
Chile	116	109,289	....	....	25	41,444	....	....
Uruguay	139	149,495	....	....	481	444,367	....	....
British India	39	42,329	....	....	1,880	2,000,366	....	....
Dutch E. Indies	158	282,380	48	94,655	275	346,153	64	136,266
Brazil	95	94,634	....	....	784	608,591	....	....
Australia	212	242,047	....	....	547	615,838	....	....
New Zealand	65	84,550	....	....	505	525,164	....	....
Philippine Isl	156	223,288	12	22,283	158	162,573	102	159,454
Brit. So. Africa	93	109,688	....	....	914	1,041,138	....	....
China	127	185,678	67	112,995	62	97,464	7	11,356
Japan	670	816,864	137	193,602	122	133,993	85	100,480
British Oceania	...	....	53	91,037	....	....	117	185,053
Sweden	72	109,900	....	....	622	700,937	....	....
Other countries	322	1,308,301	177	203,042	2,655	2,940,167	1,423	1,659,808
Totals	3,445	$4,172,126	1,233	$3,153,389	14,355	$15,782,532	3,121	$4,598,816

NOTE:—Where no figures are given any exports are included with "Other Countries."

Heavy Trucks Only Admitted to France

NEW YORK, May 4—The automobile import embargo, recently declared by France and announced by AUTOMOTIVE INDUSTRIES in the issue of April 29, will affect all chassis of a weight less than 2500 kilograms, about 5500 lb. According to information received here, only the heaviest trucks will be admitted into France from foreign countries. Parts, except bodies and engines, are not banned and tractors are not affected.

Complete information as to the embargo has not been received here and exporters are still at a loss to know just what course they may take in regard to such automotive products as equipment and tires which may or may not come under the ban. However, press dispatches have carried statements from American car representatives in Paris that they will be able to do nothing but to maintain service and make repairs. All shipments leaving the United States after April 27 are forbidden entry.

Sales of cars to France have been growing less during the recent months, principally as the result of the exchange situation.

ITALY TO BAR IMPORTS

PARIS, April 17—(*Special Correspondence.*)—With a view to improving the very low rate of exchange now prevailing, it is reported to be the intention of the Italian Government to forbid the importation of many goods not of primary necessity. It is believed that automobiles will be included in this list. The tendency of this measure will be to increase the price of automobiles on the Italian market, for the home factories are still unable to meet requirements. The industry as a whole is exporting at the present time one-half of its output. Fiat alone is exporting two-thirds of its output.

After being closed down completely for 18 days, owing to various labor troubles, the Fiat factory resumed work this week.

OFFICIALS TO VISIT EUROPE

NEW YORK, May 4—C. E. Thompson, president of the Motor and Accessory Manufacturers' Association, and M. L. Heminway, general manager, will sail for Paris on June 5 to attend the organization meeting of the International Chamber of Commerce. They will survey automobile conditions to obtain information for American exports.

TRUCKS FOR SOUTH AFRICA

LANSING, MICH., April 30—Duplex Truck Co. this week received an order for six trucks by cablegram from Cape Town, South Africa. Two trucks are of the four-wheel drive type and four are the new limited. The big trucks will be used in road work and the high-speed types for city delivery.

Trailer Builders Find Demand Brisk

Many Types of Bodies Sought by All Lines of Industry

NEW YORK, May 1—As many trailers were manufactured and sold during the first three months this year as during the whole of last year. The production would have been greater if the manufacturers could have secured deliveries of parts and materials and been able to ship the finished trailers.

During the three-weeks' trip among the factories from New Hampshire and Massachusetts to Illinois and Wisconsin, H. W. Perry, general manager, and H. C. Fruehauf, vice-president, of the Trailer Manufacturers' Association, found great activity in the industry and a general feeling of optimism. A number of companies have just reorganized with new and additional capital; several have moved into new and enlarged factories, others are building new plants, while still others have factories or additions projected for construction this year. Some new companies are also entering the field with plans for considerable production.

The factories are behind on orders from four to six weeks, and in some cases from $200,000 to $300,000, because of the inability to secure deliveries of axles, springs, bearings, castings, forgings, and even bolts and other small hardware.

Buying is distributed all over the country and in foreign countries. Most of the companies report numerous export sales to Europe, South America, Africa and the East Indies. The Texas and Louisiana oil fields are taking large shipments of pipe trailers, the Southeastern States are buying many logging trailers, and the Pacific Coast is an active market for all types for commercial hauling, logging, etc.

Municipalities and contractors in the East, South, Central and Western States are taking large numbers of slow-speed, bottom dump trailers for road construction work, and high-speed, side-dump, drop-frame trailers for ash and garbage removal. There is also a steady demand among farmers and small merchants for the light, two-wheel trailer for use with passenger automobiles.

FEDERAL BUILDS PNEUMATICS

CHICAGO, April 30—The Federal Rubber Co. is on the market with a complete line of pneumatic tires for trucks, which, it declares, is the result of several years' experimentation. In connection with the new product the company has adopted the slogan "Ship by Air."

PAIGE UNIT NEAR COMPLETION

DETROIT, May 1—The first unit of the new plant of the Paige-Detroit Motor Car Co. at Warren Avenue and the Terminal Belt railroad, will be completed in May. Work on this unit was started last October. The structure is one-story, 270 x 598 ft., and furnishes 165,000 sq. ft. of additional floor space. Building plans contemplate a four-story structure surrounding this unit. The new building will house the machine shop and the departments devoted to motor and truck assembly and testing. Removal of these departments relieves the congestion in the present quarters.

Other units planned include a three-story administration building with dining and club rooms. When completed, the floor space will be 4,000,000 sq. ft.

General Aluminum Buys McAdamite Company

DETROIT, April 30—The General Aluminum and Brass Mfg. Co. has purchased all the stock of the McAdamite Aluminum Co. of this city. J. P. Caritte of the McAdamite company has been elected a director and member of the executive committee of the General company. The already large facilities of the new plant are being enlarged.

The McAdamite plant will be operated as a separate unit under the direction of A. P. Slater, formerly superintendent of the aluminum and brass foundries of the Willys-Overland Co. at Toledo, who has been appointed assistant general superintendent of foundries.

TO CORRECT TRUCK LAWS

TORONTO, April 30—A bill to amend the permitted width of motor trucks on Canadian highways from 90 to 96 inches will be introduced in the Canadian House of Parliament by F. C. Biggs, Minister of Public Works and Highways for Ontario. The bill will also require that trucks of 2-ton or more capacity be required to limit loads to 50 per cent of their listed capacity outside of cities and towns during April and May, except under special permits.

Akron Population Shows Tire Growth

Census Shows Residents Now Number 208,435, an Increase of 200 Per Cent

AKRON, April 30—Production of automobile tires has kept pace with the amazing growth of Akron in population. The 1920 census figures show the city now has a population of 208,435, an increase of 201.8 per cent since 1910. Akron's increase was the largest thus far reported and places it just below St. Paul which has 234,595 people. The city has gone ahead of Kansas City, Kas., Dayton, Memphis, Nashville, Syracuse and Albany.

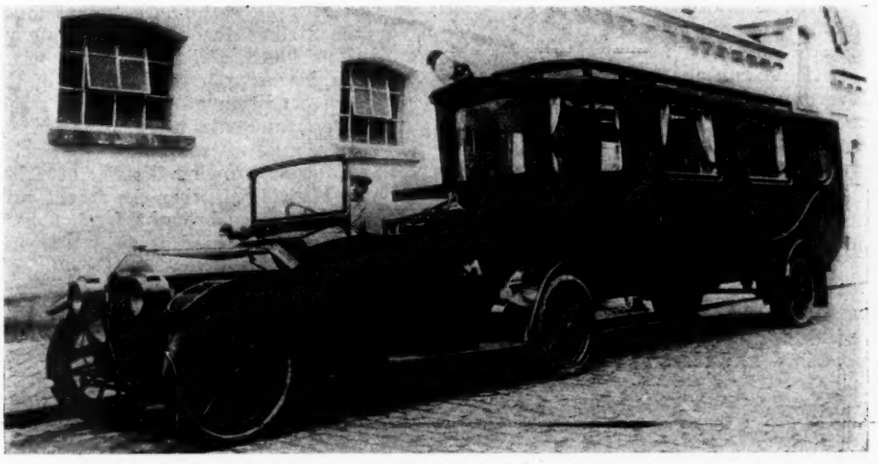
Tire production figures for 1919 show an equally astounding growth over those of 1919 in the four leading factories of the city. Goodyear Tire & Rubber Co. leaped from sales of $13,262,265 in 1910-1911 to $167,315,857 in 1918-1919 with 30,393 employees in Akron.

No farther back than 1915 the B. F. Goodrich Co. sales were $55,416,866, while the figure in 1919 was $141,343,410 with 28,000 workers. The sales of Firestone Tire & Rubber Co. in 1910 were only $5,300,000, while last year they were $91,078,513 with 17,000 employees. The Miller Rubber Co. sales were $11,000,000 in 1917 and $26,000,000 in 1919. In addition there are a dozen other tire companies in the city whose production figures are not available.

FINANCE EMPLOYEES' HOMES

AKRON, April 30—Employees of the Goodyear Tire & Rubber Co. have organized the Industrial Savings and Loan Co. to assist them in home ownership. The company will take first mortgages for 60 per cent of the value of a property.

The Way to Tour the Battlefields



This luxuriously fitted motor caravan is running on trips to the devastated areas and battlefields of France and Belgium. The occupants of the car are independent of restaurants and hotels, as when the vehicle is at rest the car can be detached and proceed to the nearest village for provisions. In daytime it can carry twelve passengers and at night sleeping accommodations for six are provided. The panels of the car are so constructed as to form hanging cupboards and shelves, while the after part of the car contains an electric kitchen and buffet

New York Air Code Abandoned for Term

Legislators Adjourn Without Action on Measure Proposed by Governor Smith

ALBANY, April 30—The New York State Legislature adjourned without taking action on the proposal that it enact legislation providing for the appointment of a commissioner of aeronautics and a code to govern air flights until the Federal Government formulates regulations to cover the entire country.

Governor Smith sent in a special message asking for a law which would sanction the appointment of an aeronautics commissioner who would have supervision over the building of airdromes and hangars, who would sanction all activities in the air such as licensing pilots and craft and who would direct the formation of an aerial militia as well as an air patrol for waterways.

Early in the session a bill was introduced by Assemblyman George H. Rowe, of the judiciary committee, which would have provided that supervision of all aerial activities should rest with the Attorney-General, who would have been empowered to formulate air traffic regulations as well as to grant licenses to pilots and planes.

All agencies interested in the development of aviation protested against this measure on the ground that it was the province of the Federal Government to formulate an Admiralty law for the air. Those who joined in the protest included the Manufacturers' Aircraft Association, the American Flying Club, officials of government departments and transportation companies which are favorably disposed toward the use of airplanes in commercial activities. As a result the bill was withdrawn at the request of its author.

The Senate and Assembly then passed a resolution which said in effect that the Legislature felt the need of air laws but believed such statutes should be national in scope and that the Federal Government should take the initiative.

ARMY GRADES AVIATORS

NEW YORK, April 30—The director of the army air service has informed the Manufacturers' Aircraft Association that the medical department of the service has carried out extensive tests on pilots to determine their fitness for flying. The pilots have been graded according to their ability to stand flying at various altitudes.

TO BAR CRAIG-HUNT PLANT

INDIANAPOLIS, April 30—When plans for the new Craig-Hunt Motors Co. building, costing $200,000 and to be located at the juncture of Indianapolis' most beautiful boulevards are submitted to the city officials for approval, Walter B. Stern, building commissioner, says he will send the application for a building permit to the Board of Safety, where there is a petition by the park board that this permit be not granted. The park board says the erection of this building will mar the city beautiful and damage property values.

The plans have been made. J. R. Craig says that this building will be used as executive headquarters and that his company is negotiating for a new factory site in the industrial section of the city.

Union Carbide Takes Over Haynes Stellite

KOKOMO, IND., April 30—The Haynes Stellite Co. of this city and the Union Carbide and Carbon Co. of New York have merged. The merger, according to announcement, was made on the basis of an exchange of stock, the Union company taking over all the $750,000 capital stock of the Stellite company and the stockholders of the latter company receiving stock in the Union company in return.

Because it was an exchange of stock, the exact consideration for the Stellite stock is not revealed. The Stellite factory will be operated by the Union company, but the plant will remain in Kokomo. Elwood Haynes, president, and J. C. Patten, secretary, of the Stellite company, will no longer be connected with the management.

Rail Rates Open Way for Trucks in Spain

MADRID, SPAIN, March 27—(*Special Correspondence*)—The psychological moment has arrived for the motorization of transportation in Spain because of the demands of the railroads for another increase of 35 per cent in tariffs in addition to a 15 per cent increase recently granted. To enforce their demands upon the government the railroad owners are alleged to have gone so far as to organize strikes of their employees.

The Minister of Fomento said in the house last week that he did not so much fear the strikes the companies can organize as "the strike of locomotives which rapidly approaches" because of the run-down condition of the rolling stock.

A recent announcement in the press offered regular truck transportation from the wine growing district of Chinchon to Madrid. During the recent railroad strike trucks brought fresh fish to Madrid from Santander, a distance of 275 miles.

G. M. C. TRUCK STARTS UNITS

PONTIAC, MICH., April 28—Excavation work for new buildings planned by General Motors Truck Co. has been started. Completion of the additions will permit of an output of 25,000 trucks in 1921. The first building will contain 140,000 sq. ft. of floor space, and will be used as a machine shop. A number of smaller buildings, including a power plant, will be erected, and the completed factory will cover 11 acres. Completion of contemplated additions is expected to require all of this year.

Tractors Oppose Tackle in Trials

Autumn Tests in England Will Determine Merits of Two Systems

LONDON, April 12—(*Special Correspondence*)—The entry list for the Royal Agricultural Society's autumn tractor trials, at which the agricultural branch of the Society of Motor Manufacturers and Traders will assist, is the largest and most comprehensive on record for this country. If all the entrants put in an appearance, the trials will almost equal anything ever held in America, and will certainly be more representative of prime movers for agricultural purposes.

Of outstanding interest will be the classes for steam tackle, as distinct from tractors, and every British maker of standing is to compete, so that some idea will be furnished of the relative merits of the two systems. Another interesting point is the entry of one-way motor plows, which are so much in request because of the minute headland they leave, and the minimum compression of the land which follows their use. Self-contained motor-plows are also strongly represented, and several British makers will compete at such an event for the first time.

The developments which have taken place in British tractor construction since the trials of last year are demonstrated by the entries in the classes reserved for internal combustion engine tractors. Some firms have now entered a heavy as well as a light machine, while others have redesigned and improved their models as a result of previous experience. In this section there will be heavy foreign competition, and some American-made tractors will publicly appear in this country for the first time. Different types will take part, not the least novel being an Italian tractor with a four-wheel drive.

UNIVERSAL MOTOR BUILDS

OSHKOSH, Wis., May 3—The Universal Motor Co. of Oshkosh, Wis., manufacturing gas engine driven electro-generators for farm lighting and similar purposes, will start work this week on the erection of a new three-story plant, 75 x 150 ft., and a one-story auxiliary building, 150 x 200 ft., which will involve an investment of about $200,000, including new equipment. The architect is Julius F. Dreger, Oshkosh. The Universal Foundry Co., an affiliated corporation, is now doubling its capacity by installing a second cupola and otherwise extending its shops.

PLANE SPEEDY IN CLIMB

NEW YORK, May 3—Clarence Coombs, in a 150 hp. Orenco Tourister biplane, established a world's record at Hazelhurst Field by climbing 6000 ft. in eight minutes with three passengers. The record was made during an attempt to set a new altitude mark for an airplane carrying three and a pilot.

Educators to Act On Road Problems

Development of Highway Courses in Colleges Set for Discussion May 14-15

NEW YORK, May 1—Leading educational authorities of the United States will meet in Washington, May 14 and 15, to discuss extension of highway engineering courses and the introduction of highway transportation as a subject in the college curricula, with representatives from the Bureau of Public Roads, State Highway Departments, Bureau of Education and leaders of the automobile industry.

The conference was called by P. P. Claxton, Commissioner of the United States Bureau of Education. The purpose is to bring about a mutual understanding of the problems ahead in the development of trained men for road construction and for the automobile industry.

The field for which it will be necessary to fit men is a broad one. Technical engineers will be required for the research and design departments, complete instruction will be necessary in the business administration, advertising and similar departments of the office force, and there is always a broad field for the skilled mechanic. The man who sells motor trucks in the future will need to be equipped to sell transportation rather than simply the mechanical unit, since into the use of the motor truck goes a knowledge of operating costs of possible tonnage to be developed, and other factors which require a great deal of study. The same statement applies as well to the manager of the fleets of motor trucks which have already become a factor in commercial life.

The Washington conference was preceded by an informal conference held in Ann Arbor, when representatives of the various groups met to determine upon a program. This conference will be followed by a general educational conference, May 19 to 21, in Washington, which will be attended by all the leading educators of the United States.

GOODRICH SUIT WINNER

In a story in AUTOMOTIVE INDUSTRIES, April 15, relating to a suit of the Auto Tire Exchange, Inc., against the B. F. Goodrich Co., it was stated that the Auto Tire Exchange won. The suit was won instead by the Goodrich company. The cause of action was an alleged failure to deliver tires and the amount asked was $36,634.09.

OVERHEAD VALVE PATENT

LONDON, April 30—There is a report in British trade circles of an impending legal dispute concerning the use of overhead valves without rocker mechanism. A French firm claim that they have a master patent on the system recently introduced in two or three British car engines. What is the nature and extent of the claim is not reported at present, but as far as the use of direct cam-operated valve motion is concerned, the type has been used by the Green Aircraft Engine Co., Ltd., for at least ten years.

(The patent referred to undoubtedly is that of Birkigt, covering a method of adjusting the valve clearance when an overhead cam acts directly upon a valve in the cylinder head.—Editor.)

Indiana Manufacturers Endorse Open Shop

INDIANAPOLIS, April 30—Resolutions indorsing the open shop among manufacturers in Indiana, among whom are the manufactories of all automotive products, and the recommendation of the revision of the state tax law to make it more equitable, were adopted at the sixth annual meeting of the Indiana Manufacturers Association at the Claypool hotel.

J. L. Kimbrough of Muncie was elected president; W. F. Taylor, Indianapolis, vice-president; Linn Faulconer Seymour, second vice-president; Fred C. Gardner, Indianapolis, treasurer. S. L. Jones, Anderson; F. M. Ruddell, Kokomo; H. C. Stickel, Terre Haute, and Oscar Soderquist, East Chicago, were elected members of the board of directors.

James A. Emory of Washington, general counsel for the National Manufacturers Association, speaking of the condition of chaos in the country, said that while dark clouds seem to be looming, he could see daylight ahead, for he had an abiding faith in the American people.

COLUMBIA TO AID UNIT

DETROIT, MICH., April 30—Columbia Motors Co., which recently increased its capital stock from $500,000 to $7,000,000 through a 700 per cent stock dividend, has prepared plans for a new factory which will have a frontage of 400 ft. on Fort Street and running back 700 ft. to Boyd Street. The new plant will be used for assembling and the present plant on Mack Avenue will be used exclusively for manufacturing and storage purposes.

All of the new buildings will be 80 ft. wide and of modern type architecture and construction.

FEDERAL TRUCK BUYS SITE

DETROIT, May 1—The Federal Motor Truck Co. has purchased 60 acres inside the city limits, three blocks west of Grand River, on the Detroit Terminal Railroad. The company plans the site for the extension of its truck factories. Pending construction work on the new property the company will erect an additional unit on its present site which will give it 70,000 more feet of floor space.

MAXWELL INCREASE ON CARS

NEW YORK, April 30—The increase in price on all Maxwell models, effective May 1, applies to passenger cars only and not trucks, as stated in the last issue.

Briscoe Earnings $904,713 for Year

Annual Report, Based on New Appraisal of Holdings, Shows Sound Basis

DETROIT, MICH., May 3—Evidence that the Briscoe Motor Car Corp. has "turned the corner" and is on the road to prosperity is furnished by the company's financial statement as of Nov. 30, 1919. During the fiscal period then ended the company has been given several bitter doses, which in final analysis combine to put it on a stronger financial basis.

The asset items of patent rights, good will, etc., have been cut from $4,000,000 to $2,000,000. A new appraisal of the company's land, buildings, machinery, etc., has been made. The figure reached, $2,457,908, allows for depreciation of the plant account since the company's organization. Nothing has been allowed for depreciation in previous statements.

After this paring down process there remains a balance of assets applicable to the 90,000 no par common shares outstanding of $4,200,000, or approximately $47 per share.

The company's fiscal period will be changed from Feb. 28 to Nov. 30. The current earnings statement, before, is for nine months ended Nov. 30. Net earnings for the period were $904,713, or at the annual rate of $1,200,000.

After liberal allowances for depreciation, adjustments or inventories and losses on discontinued models, there remained a balance of $381,281. Preferred dividends totaled $78,750 and federal taxes $92,976, leaving surplus earnings of $209,554 applicable to the common stock. The income account and balance sheet follow:

Net earnings	$ 904,713
Deduct	
Stock sub. exp.	42,250
New tools, dies, etc.	61,832
Depreciation	133,289
Ad. of inventories	286,070
Preferred dividends	78,750
Federal taxes	92,976
Surplus earnings	209,554

Assets

Current assets	2,363,741
Plant acct., etc.	2,457,908
Patents, good will	2,000,000
Def. stock sub. exp.	58,498
Total	$6,880,147

Liabilities

Current liabilities	909,547
Seven per cent deb. notes	250,000
Sundries	5,800
Reserves	14,544
Preferred Stock	1,500,000
Common stock, (90,000 shares)	4,200,256
Total	$6,880,147

1920 Output to Be 25,000

During the full year of 1919 the company manufactured and sold approximately 12,000 cars. Booking so far in 1920 totals 20,000 cars. Production for this year is expected to be 25,000 cars, or more than double the 1919 output. Plant additions and new equipment make the new production possible.

Commodity Rates Opposed by Industry

Michigan Manufacturers and N. A. C. C. Enter Objections at Hearing Before I. C. C.

NEW YORK, May 3—Automotive interests and manufacturers of passenger automobiles, trucks, and agricultural implements were represented today when the Interstate Commerce Commission began its series of hearings on the complaint filed by the Intermediate Rate Association against the railroads regarding proposed advances in rates on various automotive and agricultural products from points east of the Mississippi to the Pacific Coast.

It is proposed to cancel the commodity rates on automobile and truck freight cars and apply class rates. In effect this would increase freight rates on motor cars from $4.625 per 100 pounds from New York to the Pacific Coast to $4.90, and would result in the following advances in tariffs: from New York to Reno, from $4.375 to $4.65; from New York to Spokane, from $4.375 to $4.65; from New York to Salt Lake City, from $4.25 to $4.405, per 100 pounds. There would be proportionate increases in rates from Chicago and other points east of the Mississippi to the Western cities mentioned.

Interests which filed intervening petitions against the proposed advances included the National Automobile Chamber of Commerce, represented by James S. Marvin, traffic manager, and George N. Brown, of counsel for the Chamber; and the Michigan Manufacturers Association, which includes in its membership many of the automobile manufacturers, among them being the Ford company, and farm implement and tractor makers in the southern Michigan peninsular. The general attitude of the Eastern automotive and agricultural manufacturers is expressed in the following paragraph quoted from the intervening petition filed by the Michigan interests:

Will Affect Market Values

"Petitioner therefore represents that rail advances and charges will vitally affect the ability of petitioner's members to market their said products in those territories as against competitors whose rates and classifications are to remain unchanged or else are not changed and advanced as are the rates and classifications to which the products of said petitioner's members are subject."

The proposed increase in rates is brought about by complaint on behalf of the intermediate rate territory asking that the rates at such intermediate points as Spokane and Reno be graded lower than the rates applying to terminal points, such as Seattle and San Francisco. Those complaints, however, did not have any specific proposal to make as to what the graded rates should be, and it was therefore suggested by the Interstate Commerce Commission that a railroad rate committee work out a plan and present it to the Commission. The plan worked out was an increase in the Pacific Coast rates rather than a reduction in the rates at intermediate points, and it is this increase against which the automotive and agricultural manufacturers, among others, are protesting at the present hearings.

Further hearings are to be held at Chicago on May 10, Spokane on May 17 and San Francisco on May 24.

Aluminum Corporation to Specialize Product

CLEVELAND, May 6—Aluminum Manufactures, Inc., has decided to confine its activities to the established line of aluminum and brass castings for the automotive industry.

"Instead of thinking about what is going to happen in the trade in ten or fifteen years, we are looking to the present day conditions and concentrating our efforts on meeting the consumers' demands in our line," said an officer of the company.

As a consequence of this policy, the sales extension department has been virtually abolished and D. Dyer, the manager, has left the company. Curtailment of sales expansion has eliminated ten men from the sales force and several more from the laboratory staff.

Until the new policy was decided upon, the company was carrying on an active campaign for new lines of aluminum castings. The sales department has been trying to induce various industries to substitute aluminum for iron and steel, which would have thrown it into direct competition with makers of iron and steel castings.

The company operates plants in Detroit, Cleveland, Buffalo, Garwood, N. J., and Fairfield, Conn.

Reasonable Safety Approved by Council

NEW YORK, April 30—At the spring meeting of the engineering section of the National Safety Council held April 27 for the purpose of making suggestions for suitable legislation, the discussion centered around the point whether belt guards should be sufficient to protect against damage in case of breakage or merely prevent contact with a moving belt under working conditions. A rising vote of the members showed that the latter course was favored. During the discussion, the opinion was expressed that the cost of securing absolute safety would be prohibitive in the case of the breakage of a high-speed belt of large size, just as it would be impossible to secure absolute safety in the vicinity of an exploding engine. Reasonable safety was the keynote of the meeting, and a program for extreme measures was considered harmful to the cause for which all are working.

The automotive industries were referred to as a field in which great progress has been made in the adoption of suitable appliances for guarding against accident.

N. A. C. C. to Cooperate with Reserve Banks

Data Regarding Industry Will Be Supplied in Move to Adjust Finances

DETROIT, May 5—Directors of the National Automobile Chamber of Commerce in session here to-day decided to tender the good offices of a delegation from that body equipped with facts and figures to the Federal Reserve Bank officials in Washington, New York and Kansas City in the effort to adjust the financial situation as regards the industry if such action is asked.

The decision was the result of the action of the governor of the Kansas City Reserve District declining to rediscount automobile paper on the ground that passenger cars were non-essentials. While the action appeared purely local the effect seems to be spreading and Detroit bankers have tightened up, bringing about a situation which one prominent banker in Detroit describes as serious.

General Manager Reeves of the National Automobile Chamber said the organization had received a denial from the Kansas City governor that he had ordered rediscounting of automobile paper stopped and said advices from that city were to the effect that the banks were overloaded with loans of all kinds, and when it came to tightening up the automobile industry was turned to as one of the largest borrowers. The report stated that the situation was clearing and soon would be adjusted satisfactorily.

The steel situation also was discussed at length and the directors went on record for increased rates for the railroads and for giving them all the steel necessary to restore the transportation system. The industry was declared ready to joint all other industries in curtailment of consumption of steel to the extent that may be demanded. Col. Charles Clifton presided at the meeting.

HERCULES HAS NEW TIRE

CINCINNATI, May 1—Unusual claims are made for a new tire that is to be put on the market by the Hercules Rubber Corp., which has been formed by a group of well-known Cincinnati business men with a capitalization of $1,000,000.

According to the officials of the company, the new tire will be guaranteed for 10,000 miles without a puncture, and will be serviced absolutely free to all users. It consists of a heavier casing than usual with a newly patented inner tube, which is said to be an airless truss tube which finished 16,000 miles in recent tests without a puncture.

COLUMBIANA FOUNDRY BUILDS

McKEESPORT, PA., April 30—The Columbiana Foundry Co., Columbiana, O., has under construction here a new plant to be equipped exclusively for the manufacture of small gray iron castings, such as automobile and tractor castings.

New Packard Leader Rose from Mechanic

E. F. Roberts Now Vice-President —In Charge of Manufacturing

DETROIT, April 30—From a helper's position in a Massachusetts machine shop to a toolmaker's bench in the original Packard Motor Car Co. factory at Warren, Ohio, thence step by step to the vice-presidency of the big organization tells the story of the rise of E. F. Roberts, who to-day was placed in charge of Packard manufacturing.

Born in Champlain, N. Y., 44 years ago, Roberts at an early age secured a job in the shop of E. J. Moore as a helper. When Packard began operations in Warren, Ohio, Moore accepted employment with the company and brought with him from Massachusetts the boy Roberts, who had helped around his shop. Roberts with the knowledge gained under Moore went to work as a toolmaker, one of 175 employees then working for the company which built two cars a week.

Later in the year the factory moved to Detroit and soon the efforts of young Roberts blazed a trail to the position of foreman of the experimental shop. Just a few months there proved him capable of greater effort and he was transferred to the motor room as foreman. A little more than a year later Roberts was made assistant superintendent, and in 1908 he was made factory superintendent. In 1910 he was promoted to factory superintendent.

In 1911 Roberts received another promotion, this time to be general superintendent. His ability forced him onward, and in 1916 he was made factory manager, retaining that position until his appointment to-day to succeed F. F. Beall as vice-president in charge of manufacturing. The 175 employees with whom he worked in Warren and grew up in the Packard service, remained with him in many cases.

WRIGHT BUYS IN PATERSON

NEW YORK, April 30—Erection of its proposed new plant near Newark, N. J., at an estimated cost of about $300,000, has been deferred by the Wright Aeronautical Co. of America. It has leased a four-story steel and concrete building, 75 x 300 feet, at Paterson, with an adjoining site comprising 7½ acres, and will establish a plant there. The company has the option of purchasing. In its initial operations the company will give employment to about 500 men.

ARMY BUYS GOODYEAR BLIMPS

SAN FRANCISCO, April 30—Announcement has been made at the aeronautical exposition now being held at the auditorium in this city that the Goodyear Tire & Rubber Co. has closed negotiations with the War Department for the sale of two "pony blimps" of the type exhibited for the first time on the Pacific Coast. Both airships will be used for training purposes as well as for aerial co-operation with other branches of the military service.

While the "pony blimps" were designed for commercial purposes they will be valuable for artillery spotting, observation, scouting, aerial photography and map making. The ones sold to the army will be of the tractor type, capable of a speed of 40 miles an hour and with a cruising radius of more than 400 miles.

Indianapolis Plants to Make 96,500 Cars

INDIANAPOLIS, April 30—Approximately 96,500 automobiles will be produced by the ten motor car industries in Indianapolis this year and the total sales value of these machines will be $167,337,500, according to B. A. Worthington, chairman of the industries committee of the Indianapolis Chamber of Commerce. His statement was made on a survey of the automobile industry made by Myron R. Green, director of the bureau of industry.

The survey shows that 12,300 men are employed in the manufacture of motor cars in Indianapolis and that the capital invested of about $24,000,000. The value of motor cars to be exported by Indianapolis factories this year is estimated at $5,445,000. These figures do not include capital invested by equipment and parts manufacturers of passenger cars.

These figures indicate that 840 cars are made monthly in Indianapolis, or about 28 a day.

Petroleum Institute Engages Dr. Manning

WASHINGTON, May 3—Dr. Van H. Manning has resigned as director of the Bureau of Mines, Department of the Interior. His resignation becomes effective June 1, after which he will become director of research with the recently organized American Petroleum Institute. He has advised the President that the salaries paid scientific men in the employ of the Government are entirely inadequate and his withdrawal from the Government service may be taken as a protest against low salaries.

NASH SALES DOUBLES STOCK

MILWAUKEE, May 3—The Nash Sales Co. of Milwaukee, which acts as distributer of a considerable part of the output of the Nash Motors Co., Kenosha and Milwaukee, in the Central West, has increased its capital stock from $500,000 to $1,000,000. The company is embarking on a new building project costing $350,000 at Milwaukee, providing a four-story fireproof sales and service building at Broadway and Oneida streets, to be 120 feet square.

HUPP ADVANCES PRICES

DETROIT, April 30—Prices on Hupp models have been advanced to the following rates: 2- and 5-passenger touring, $1,685; coupe and sedan, $2,485.

British Truck Men Agree on Discounts

Terms Correct Rebate Abuses Which Began With Inception of Industry

LONDON, April 15—(*Special Correspondence*)—An agreement has been signed between the Association of British Motor Manufacturers and the Agents Section, Ltd., under which no discount or rebate of any kind will be given to a firm buying or owning less than ten commercial vehicles. If a buyer owns from 11 to 25 vehicles he is entitled to a discount of 2½ per cent, if he owns from 26 to 50 he gets 5 per cent, and above 50 vehicles 7½ per cent. The discounts to agents are fixed at 10 per cent for the first ten vehicles, with a rebate of 1 per cent on every fifth vehicle after the first ten, or 15 per cent on the 35th.

The agreement is designed to eliminate the custom in vogue for years under which discounts were given both on commercial vehicles and parts to those who used them. It grew up because in the earlier days of the industry dealers were neither willing nor able to undertake the exclusive handling of trucks. For that reason the manufacturer dealt direct with the user. The practice extended until dealers sometimes found that when they could get a discount of only 12½ per cent their own customers, by judicious manipulation, could get 15 per cent.

As the trade became stronger it made strong efforts to eliminate this practice. The lead was taken by American makers who deal exclusively with the trade on definite terms and never grant discounts to users. While the American manufacturers are not included in the agreement, it is presumed they will adhere to it because it follows their usual business practice.

ONEIDA TRUCK RECAPITALIZES

GREEN BAY, WIS., May 3—Plans for expansion of business were perfected at the annual meeting of stockholders of the Oneida Motor Truck Co. of Green Bay, Wis. The corporation will be reincorporated in Delaware, and the capitalization of the present Wisconsin corporation, $600,000, will be increased to $7,500,000, consisting of $5,000,000 of cumulative participating preferred stock, and 50,000 shares of common stock without par value. A new issue of $1,000,000 is now being made.

BERGOUGNAN BUILDS UNIT

TRENTON, N. J., April 30—Construction of an additional factory unit and a large warehouse for the storage of raw materials has been begun by the Bergougnan Rubber Corp., to provide for increased production.

The directors of the Bergougnan corporation have declared a quarterly dividend of 1¾ per cent on the preferred stock.

Kahn Introduces Air Service Bill

Would Unite All Government Aviation Branches Under Appointive Director

WASHINGTON, April 30—A new bill was introduced this week by Representative Kahn which would provide for the creation of a new bureau separate and distinct from existing executive departments and to be known as the Bureau of Air. The proposed bureau would be under the control of a "Director of Air" appointed by the President, this office carrying with it a salary not to exceed $12,000 per annum.

Representative Kahn's bill would authorize the complete transfer of all branches of the air forces of existing departments such as Army and Navy, Post Office, etc., these branches to function very much in the same manner as heretofore, but under the direction of the proposed Bureau of Air. The National Advisory Committee would be abolished and its duties, property, personnel, etc., absorbed by the Bureau of Air. The bill carries a provision limiting the total strength of the consolidated air forces to that of the authorized air personnel of the existing departments, the pay and allowances to be based on the present Air Service rates.

The proposed bureau would have a Board of Control reporting directly to the Director of Air and consisting of three members appointed by the Senate for the term of four years. One member would represent the War Department, another the Navy and the third the Post Office and other departments affected; the third member being required to be a civilian. An appropriation of $100,000 is provided.

The new bureau is not to engage in aerial operation of a military or naval character independent of the War or Navy Departments, excepting when such operation is expressly directed by the President. The provision is made that the War Department shall have control of all aerial operation of an armed nature, operating from a land basis, while the Navy Department is given similar charge of aerial operations operating from the fleet, and the operation of the aerial mails is left to the Post Office Department. An important provision of the bill is the turning over to the proposed bureau of air responsibility for the control of all matters pertaining to civilian aerial traffic and navigation.

To Control Aerial Regulations

The new bureau would be authorized to promulgate and enforce such rules and regulations for the control of civilian air travel as may be necessary for the national welfare and for the protection of lives and property or as may be prescribed by law from time to time. This same provision of the bill carries with it a penalty of a fine not exceeding $1,000 or imprisonment for a term not exceeding one year or both, for violation of any of the orders or regulations of the Bureau of Air, made for the protection of civil air travel.

There has been considerable discussion since the signing of the armistice, both for and against a United Air Service, and this bill should bring the matter to a head, as it gives the House an opportunity to put itself on record as for or against a United Service. The aircraft industry in this country is, at present, in an extremely unsettled condition due to indecision as to future plans by the Government and action on the new bill will be closely watched.

Western Planes Shown at San Francisco Show

SAN FRANCISCO, April 30—Several airplanes not exhibited at New York and Chicago were shown at the San Francisco Aeronautical Show, just closed here. They were products of the Boeing Airplane Co., Seattle, and the Loughead Airplane Co., Santa Barbara, Cal. Other exhibitors, whose models were on view at the earlier shows, were Aeromarine, Curtiss, Dayton Wright, Martin, Goodyear, while the Fowler Airplane Co. exhibited an English Avro.

The Boeing company exhibited a model called the B.B.L.-6, having a wing spread of 45 ft., and an overall length of 28 ft. The plane was powered with a Liberty engine, having a maximum speed of 110 m.p.h. and designed for a ceiling of 20,000 feet. It will be utilized for passenger carrying flights between Spokane and Seattle and in the Mount Rainier district. The company also exhibited 18-ft. seasleds powered with Sturtevant engines.

Loughead exhibited a two-seater having a wing spread of 28 ft. that is designed for sale at $3,000. It has a monocoque body and is operated by a 25 hp. engine developed by the Loughead engineers. The model also includes a new feature, recently tried out by Allan Loughead, in which the lower wings are combined for use as ailerons when thus required.

Goodyear's exhibit consisted of a new "pony blimp" similar to that shown at New York and Chicago but powered with a Lawrance radial engine mounted as a tractor. Formerly the power was delivered by an Ace engine mounted as a pusher.

PLANE FLIES FROM MIAMI

NEW YORK, May 3—Possibilities of commercial aviation between Miami, Fla., and New York were demonstrated by Aero, Ltd., when "Miss Miami," its H. S. 2-L six-passenger flying boat, equipped with a 400 hp. Liberty motor covered the distance in a straightaway flight in 15 hr. and 35 min. with one stop at Moorehead City, N. C., for gasoline. The plane will be used in passenger service between New York and Boston. It was piloted on the trip from Miami by Harry Rogers and Sidney Schroeder. They were accompanied by a mechanic.

Committee Moves to Separate Shows

Overshadowing of Trucks by Passenger Cars Prompts Change in Exhibit Plan

DETROIT, May 4—Elimination of the annual truck show, or at least separation from the passenger car exhibits and arrangements for a more elaborate presentation of truck activities to arouse interest in the show, will be recommended to the National Chamber of Commerce as a result of a meeting of the motor truck committee held here yesterday. The matter will be disposed of finally at a meeting in New York in June.

It was urged at the meeting, and it seemed to be the opinion of all members of the committee, that the truck show is so overshadowed by the passenger car exhibit as to make it of little consequence when the two shows are held simultaneously. It was decided that it would be to the best interest of the truck manufacturers to hold the show in October, November or April, and not in conjunction with the passenger car exhibit.

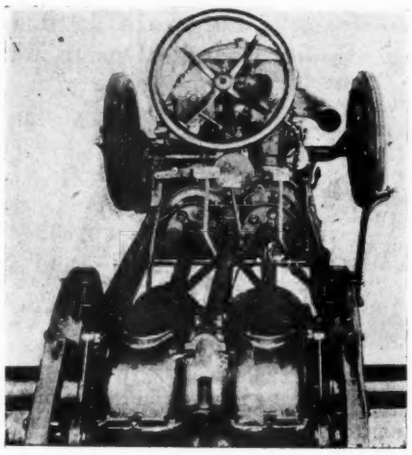
It also was proposed to show activities in the truck field as regards loading and unloading devices with moving pictures, illustrating for instance, the method of operation in use by the Standard Oil Co. and other big fleet owners. The elaborate devices in operation and the interest and discussion aroused among competitive fleet operators it was thought would add greatly to the interest and arouse enthusiasm that would contribute more attention to the truck exhibit.

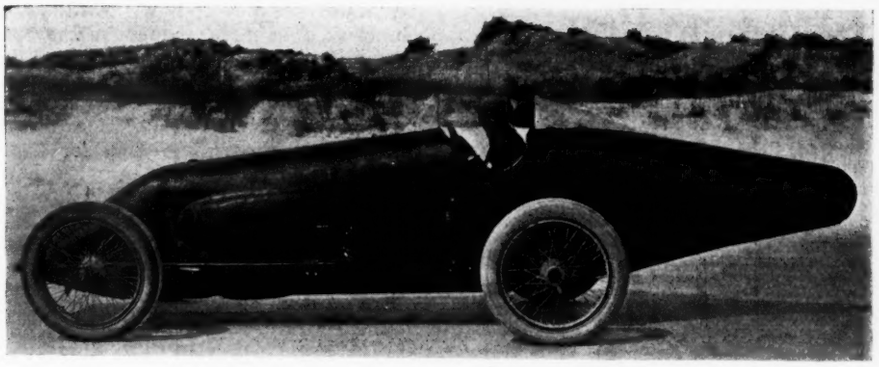
Another feature taken up by the committee was formulation of plans looking to the protection of established truck lines against price cutters and competitive lines started with the idea of fixing prices that would impair the efforts of the established lines. No action was taken on this matter, but an investigation was ordered in the effort to determine the best method to overcome the encroachment of the price cutters and protect established lines. The meeting was directed by V. L. Brown, president of the Sterling Motor Truck Co.

SPAIN TO SHOW TRACTORS

MADRID, March 20—(*Special Correspondence*)—The Agricultural Chamber of Seville is arranging a mechanical farming demonstration on cultivated and uncultivated lands. This will take place on the Rosario (Torre Blanca) and Tablada farms, from May 1 to May 15. There will be four classes, as follows: (1) Tractors (both wheeled and chain track); (2) Combined tractors and implements (motor plows, motor cultivators); (3) Implements drawn by cable; (4) Miscellaneous implements. Applications should be sent to Agricultural Chamber, Tintes 12, Seville.

THE DUESENBERG CHASSIS





Milton and His Record Breaking Car

After breaking records for all distances up to five miles at Daytona, Milton was compelled through injury to his eye to desist from attacks on the ten and twenty-mile marks of Ralph De Palma. Milton will be fully recovered for the Indianapolis sweepstakes. The chassis at the left shows the individual propeller shafts for each rear wheel.

Lubricant Tests Named by Bureau

Committee on Standardization of Petroleum Specifications Adopts Efficiency Method

WASHINGTON, May 3—Specifications and tests for lubricants adopted by the Committee on Standardization of Petroleum Specification which became effective April 16, were made public this week by the Bureau of Mines, Department of the Interior. This committee, which was appointed under the authority granted in an executive order of July 31, 1918, has found it possible to co-ordinate and standardize specifications drawn up by various departments and agencies purchasing lubricants. They have eliminated some tests of doubtful value and made an effort to simplify and harmonize the wording of the specifications.

The work of this committee is by no means complete. The Technical Sub-Committee, which has held several meetings with manufacturers and consumers of lubricants, will hold special sessions within a few weeks to discuss further specifications for petroleum products. The standardization committee has not been too stringent in their regulations but has allowed the refiners great latitude in their choice of crude oils. Their work, however, has, to a large extent, abolished conflicting specifications of federal departments and agencies purchasing petroleum products.

Provide Three Classes

One of the chief results of the committee's investigation has been to group a large number of oils in three classes. Under their tests, Class A comprises oils suitable for ordinary engine and machine lubricating; Class B, oils for high-speed engines, turbines and dynamos, where an emulsion test is required; Class C comprises oils suitable for gasoline engines, motor cars, and air compressors, also oils which can be used as extra high grade turbine and dynamo oils. It is claimed that the oils of Class C meet requirements for carbon residue as well as emulsification tests.

The grades are determined according to viscosity. The three classes of oils are divided into five grades, which in Government purchases, will be known as extra light, light, medium, heavy and extra heavy. Special oils and greases are cared for under other specifications.

The committee calls attention to the fact that the specifications have been drawn on the basis of lubricating efficiency without reference to the sources of the oil. Their purpose in making this allowance to refineries was attributed to the fact that further experimentation in lubricants must be encouraged.

Trailer Manufacturers to Meet in Detroit

NEW YORK, May 1—Trailer manufacturers throughout the country have been invited to attend a meeting of the Trailer Manufacturers Association in Detroit on May 6. The subject of greatest importance to be considered is the ruling of the Treasury Department that semi-trailers are taxable at 5 per cent under the Revenue Act of 1918 and that the tax is retroactive to Feb. 25, 1919.

A number of trailer manufacturers who have applied for membership in the association are expected to be admitted at the meeting of the Executive Committee to be held in Detroit on May 5, preceding the members' meeting.

GIANT GRIP COMPANY FORMED

OSHKOSH, WIS., May 3—The Challoner Co. and the Giant Grip Horseshoe Co. of Oshkosh, Wis., have been consolidated and will continue business under the name of Giant Grip Mfg. Co. The Challoner Co. is a large manufacturer of non-skid appliances designed for motor truck wheels.

Michelin No Longer in Top-Price Class

Enlarged Factory and Added Machinery Brings Greater Production—More Buildings Coming

MILLTOWN, N. J., May 3—The Michelin Tire Co., which has been manufacturing in the United States for 12 years and whose prices have generally been above the average, is getting into the large production class in tire manufacture and plans from now on to hold its prices below, instead of above, the average leading makes. With the last change in tire prices the Michelin figures were so adjusted that it is no longer a higher-priced tire.

In order to maintain its previous standards and permit the adoption of this new policy, the plant and organization have been in process of expansion for some time, but the growth has not been widely advertised. In tube manufacture Michelin to-day is not far from the top in the industry.

Two new buildings have just been occupied and two more will be ready next season, all equipped with modern automatic machinery which permits the production to be practically doubled and does not require anywhere near the doubling of the number of workers. Seven or eight branches have been established within the last year and there are now 28 all told, including new ones in Charlotte, Memphis, New Orleans, Omaha and Lynchburg, Va. An intensive effort is being made to develop the South. The Atlanta branch now has 37 field men.

UNION PACIFIC BUYS M'KEEN

OMAHA, April 30—The Union Pacific Railroad has purchased the holdings of W. R. McKeen in the McKeen Motor Car Co. and now holds virtually all the stock. The company manufactures a gasoline motor-driven passenger car for interurban travel.

G. M. C. to Develop Trucks and Tractors

Financing Program Fixed at $30,000,000 Links J. P. Morgan With Corporation

NEW YORK, May 4—Reports of new financing contemplated by the General Motors Corporation are to the effect that the funds obtained will be used mainly in the development of truck and tractor facilities. President Durant is known to be deeply impressed with the possibilities in the motor truck field. The recent purchase by the company of a plant at Doylestown, Pa., which made agricultural machinery indicates the interest of the company in motorization of the farm.

Durant has just returned from Detroit, where he spent several days. He held several conferences with heads of units and with R. E. Olds, president of the Reo Motor Car Co. He declined to discuss reports that he had purchased Olds' control in Reo. It is significant, however, that Reo manufactures one of the most popular light trucks in the country for use on farms.

The name of J. P. Morgan has been connected with General Motors financing plans. Representatives of his company have had conversations with officers of General Motors in regard to the future financial plans of the corporation. It is understood Morgan representatives soon will visit some of the General Motors plants to familiarize themselves with their operations.

Reports of the new financing have placed it in the neighborhood of $30,000,000. Last January the company offered holders of the preferred and 6 per cent debenture issues, aggregating 787,180 shares, the right to subscribe to new 7 per cent debenture stock in the ratio of two new shares for each share of the old stock held.

General Motors Corp. has elected three new directors—Sir Harry McGowan and Arthur Chamberlain, of the General Explosives, Ltd., England, and William McMaster of the Canadian Explosives, Ltd. General Motors is closely associated with both the General Explosives, Ltd., and the Canadian Explosives, Ltd. Other directors elected were W. C. Durant, J. A. Haskell, F. W. Hohensee, L. G. Kaufman, R. S. McLaughlin, C. S. Mott, J. J. Raskob, A. P. Sloan, Jr., John Thomas Smith, E. V. Linden, H. H. Bassett, A. G. Bishop, R. H. Collins, W. L. Day, H. F. Du Pont, Pierre S. Du Pont, Irene Du Pont, Lammet Du Pont and F. W. Warner. Officers will be elected May 13.

PROPOSE WHITE CITY SHOW

LONDON, April 9—(*Special Correspondence*)—Suggestions for the next motor car show appear to have resolved themselves in favor of adapting one or more of the larger buildings of the White City, London, for a gigantic single show, probably about two and a half times the size of an ordinary year's Olympia show. The White City was built as a temporary summer show and exhibition about 14 years ago and during the war was taken over by the Government for stores.

The buildings have deteriorated and the cost of renovating them for a proposed summer show and people's haunt is estimated at $500,000. This site is as easily reached as Olympia, there being direct access to it by tube and overhead rail, as well as by motor-bus and electric street car.

British War Stores Sold to New York Firm

LONDON, March 25—(*Special Correspondence*)—The British Ministry of Munitions has cleared out its entire stock of surplus factory consumable stores in Great Britain, says the American Chamber of Commerce in London.

Rownson, Drew & Clydesdale, Ltd., Inc., of New York and London, are the purchasers of the stock which comprises over 30,000 different kinds of articles, including 120 kinds of oil alone. The amount involved is £5,000,000 sterling, and is by far the largest transaction in the disposal of war material yet carried through, with the exception of the sale to the French Government of the dumps in France and Belgium.

A large quantity of the stuff will be available for export, but under the conditions of sale, the goods must be sold in such a manner as shall safeguard British trade and industries producing and dealing in similiar goods, and as far as possible equal opportunity to acquire the goods must be given to small as well as large buyers.

The stocks will be taken over and paid for in the first instance on a valuation, says the American Chamber, but the ultimate price to be paid will be based on the actual amount obtained on re-sale.

MAJOR SCHROEDER TO FLY AGAIN

NEW YORK, April 30—Major R. W. Schroeder, who recently fell five miles after reaching an altitude of 36.020 ft. at Dayton, Ohio, has been pronounced fit to fly again by Major H. L. Bauer, head of the medical research department of the United States Air Service at Mitchel Field, Long Island. Major Schroeder was under observation of Major Bauer for several days and underwent a number of heart tests. One of the tests included an "altitude test" of 30,000 ft. It was held in a special room designed to give identical conditions as exist six miles above the earth.

MANY ENTRIES FOR AIR SHOW

NEW YORK, April 30—Exhibits of American, French and Italian planes will be accorded space in the annual British airplane show to be held at Olympia, London, July 9 to July 20. Information just reaching this country is to the effect that the allotment of exhibit room will be closed early in May and that numerous foreign makers have signified their intention of showing.

Harvester Company Shows Sales Gain

Business Larger in 1919 But Profits Dwindle Due to War Conditions

CHICAGO, April 30—The International Harvester Company's annual report for 1919 shows gross sales of $212,700,000, somewhat greater than 1918, while net profits were somewhat less than last year. Before deducting war losses in Europe charged to 1919 earnings the percentage of earnings to capital invested is 9½ per cent; after deduction, 6 per cent.

This comparatively satisfactory showing is attributed to the agricultural prosperity of the United States and Canada, which offsets in some degree serious obstacles to European trade and unsettled manufacturing conditions in this country.

European war losses have now been completely written off out of reserves established for that purpose and from current earnings during the last five years. The only investment in Russia and Germany now standing on the books consists of the plants and inventories of the factories in those countries, valued at $6,850,000. Late advices state that the plant near Moscow is still in operation and is one of the few important concerns in Russia that have not been nationalized.

The factory near Lille, France, has been re-equipped after being dismantled during four years of German military occupancy.

"In striving to rebuild its foreign business," the report says, "the Company finds much evidence to support the position that wholly apart from sentiment and merely as a matter of self interest America cannot afford to stand aloof while Europe struggles with the tremendous task of industrial and economic rehabilitation."

Farm labor scarcity and higher cost, the report says, point to a distinct danger of falling off in food production unless man-power in agriculture can be much more fully supplemented by machine power. The company's experimental efforts are now being directed toward providing the farm of average size with a complete equipment of power-driven implements that one man can operate.

Industrial Council a Success

Reviewing the first year of operation under the Industrial Council plan, whereby the workers now have a definite voice with the management in shaping all industrial relations policies, it is stated that the effect in the three severe strike tests of 1919 was to bring about an early resumption of work. Time lost through industrial unrest was held to a minimum and production suffered little.

"The plan has done much," says the report, "to foster the spirit of co-operation and has brought the employees and the management into a more intimate relation of mutual confidence."

INDUSTRIAL NOTES

Field Body Corp. has been incorporated to take over the Field Mfg. Co., Owosso, Mich., owned by J. E. Field, who will be president of the new company. Capacity will be tripled to produce the four-season cab recently put on the market and the Field all-service interchangeable series platform. Distributers have been appointed in the leading centers.

Climax Rubber Co., Columbus, Ohio, has purchased ground and is having plans prepared for the first unit of its plant which will be located along the Hocking Valley tracks. The company is now in production of Climax compression tubes at its Huntington, W. Va., factory.

Menominee Motor Truck Co., Menominee, Mich., recently bought by F. W. D. stockholders, will move its plant and equipment to Clintonville, Wis., where the F. W. D. company is located. New buildings, to cost $150,000, will be erected.

Spicer Manufacturing Co. reports a combined output of universal joints of 71,000 in March for the Pottstown and Reading plants. The Detroit frame plant was shut down for ten days but is resuming on 50 per cent capacity.

Cloud Accessories Corp. has been formed in Chicago to sell Morgan cord fan belts, silverlining for Ford transmissions and spark plugs. The company is headed by Kenneth Cloud, who started business in Long Beach, Cal.

Ideal Tire & Rubber Co., Cleveland. announces that its output will reach 300 tires a day by June 1. Distributers have been appointed at Oklahoma City, Chattanooga, Alexandria, La., Waco and Fort Worth.

Timken-Detroit Axle Co. has opened an Eastern sales office in the Post Standard Building, Syracuse, which will be in charge of Gordon H. Gannett and L. S. Wiggin.

Premier Tire & Rubber Co., Kansas City, Mo., plans to add 20,000 ft. to its plant through the erection of additional buildings.

Vim Motor Truck Co. has bought the Midvale Gun plant situated at Wayne Junction, Philadelphia.

SEEKS MORE RURAL ROUTES

WASHINGTON, May 3—Fourth Assistant Postmaster General Blakeslee has asked the Senate to repeal laws prohibiting establishment of rural motor delivery routes of less than 50 miles in length. The request was made in a letter sent in response to a resolution of inquiry by Senator King concerning questionnaires recently sent to farmers regarding transportation of food by parcel post. Blakeslee said in his letter:

"Uniformity of comment was sufficiently impressive to warrant a reference to legislative consideration, and to that end the Postmaster General has declared, in no uncertain terms, that restrictions which now prevent maximum use of facilities of postal service by food-producers should be modified forthwith; that these restrictions include present method of compensation of rural carriers, the basis of which is calculated on mileage covered daily and does not permit of payment in proportion to number of pieces or weight of mail matter conveyed, and the limitations in maximum use of motor propelled vehicles, which limitations do not permit establishment of a motor rural route less than 50 miles in length and payment of owner of such vehicle more than $2,450 annually, for daily service rendered."

Canadian Company To Make New Engine

TORONTO, May 1—Construction of a factory for the manufacture of airplane engines, rotary steam engines and fuel mixing vibrative carbureters has been commenced on Lawler Avenue, near Kingston Road. The Canadian Tygard Engine, Ltd., is undertaking this step as a part of an extension program. The building will be of fireproof brick and concrete construction, two stories in height, and will cost approximately $30,000.

In connection with the new type of airplane engine, the company believes the improvements in both engine and carbureter will remove the present handicaps to commercial flying, since the necessity of renewing the power plant every fifty hours is obviated. A branch company is operating in the United States, and it is believed that a market will be found for the output of the Canadian plant, both in the Dominion and in Great Britain, where application has been made for patent rights.

ALTITUDE RECORDS SOUGHT

DAYTON, O., April 30—Two army bombing planes are being equipped with glass inclosed cabins and super-charging devices preparatory to tests which, it is hoped, will eclipse all previous altitude marks. The motor also will be inclosed and sealed. While no official announcement has been made regarding the experiments, it is understood the air service believes the planes now being equipped can go up 40,000 feet or more. If they can be developed satisfactorily they would be used for bombing and observation purposes in time of war.

HUDSON-ESSEX PRICES RISE

DETROIT, May 4—Another increase of $200 in the prices of all models of both Hudson and Essex cars has been made by the Hudson Motor Car Co. The prices became effective Sunday.

TOOL BUILDERS TO MEET

ATLANTIC CITY, May 4—The spring meeting of the National Machine Tool Builders' Association will be held here May 20 and 21.

METAL MARKETS

Pig Iron.—Prophesies of $50 pig iron apparently fail to sharpen the buying appetite, at least for the immediate present. There have been a few sales for deferred delivery at $45, Buffalo base, and selling agencies now quote No. 2 plain at $46 to $47. On the whole, however, foundries in the automotive industries are disposed to let the freight situation right itself before worrying very much about third quarter deliveries of pig iron. Some consumers are running short, but consumption is also temporarily on the wane.

Iron and Steel.—Pittsburgh advices state that as the result of the closing down of several automotive plants, the demand for sheets has become much less pressing. Considerable of the S. O. S. business for immediate delivery at staggering premiums has disappeared. Automobile sheet interests say that much in the way of orders remains to be placed, but consumers are acting more conservatively in entering the market. A number of the sheet plants have shut down for want of coal. More and more of the independent steel producers are falling in line with the chief interest's price schedule which continues to be that of the Industrial Board.

Aluminum.—While imports of aluminum appear impressive when compared with the corresponding period of last year, they are of insignificant proportions when the consumption as a whole is taken into consideration. February imports aggregated 6,267,931 lbs., valued at $1,830,246, compared with 404,531 lbs. valued at $131,627 in February, 1919. Much of the metal brought in, comes, however, within the category of remelted material.

Copper.—Production and consumption have been hit alike hard by transportation and labor troubles. This should afford an opportunity to clean up part of the 500,000,000 lbs. that remain unsold in the refiners' hands.

Tin.—Consumers are more inclined to buy, considering Straits at 60½ to 61 cents, and No. 1 Chinese at 59½ to 60 cents, levels at which they can afford to take a chance.

Lead.—The only demand is for spot metal and immediate shipment from the West. Mexican lead is being sold here instead of being shipped to London, where the market is lower. Prompt shipment is quoted at 8½ cents, East St. Louis base, in the outside market. The leading producer quotes 8¾ cents.

Zinc.—The market is lifeless at 7.90 to 8 cents, East St. Louis.

Brass.—Strikes continue to check production. Raw metals have been shipped to the Connecticut valley by the water route from Baltimore and from Lake Superior by way of Albany. Some Waterbury brass manufacturers have been unable to get any copper in April.

Automotive Financial Notes

Lee Rubber & Tire Corp. has declared a quarterly dividend of 50 cents, thereby placing the stock on a $2 annual dividend basis. The dividend is payable June 1 to stock of record May 15. The earnings of the company for the first quarter of 1920 before reserves for taxes were $269,-233, of which $75,000 is required to pay the above dividend.

Studebaker Corp. reports net profits for the first quarter of the year as $5,272,092. After allowing for Federal taxes of $800,000 the surplus was $4,472,092, which exceeds by 15 per cent the best quarterly earnings of the company heretofore. The regular quarterly dividend of 1¾ per cent was declared by directors.

American Bosch Magneto Co. reports earnings of $477,483 before Federal taxes in the first quarter of 1920, of which $200,038 was earned in March. Net before taxes in April is expected to exceed $225,000. Profits for the year on this basis will be approximately $2,500,-000 before taxes.

Willys-Overland stockholders will hold their annual meeting May 11, when directors will be elected and some changes made in the regulations. These will include a change in the place of meeting from Toledo, which will permit of holding meetings in New York.

Maumee Pattern Co. of Toledo has been authorized to increase its capital from $10,000 to $100,000. A brass and aluminum foundry will be added to the plant. The company manufactures wood and metal patterns for General Motors Co.

Kol-Ben Wheel Co., Cadillac, Mich., has changed its name to the Simplex Wire Wheel Co. and its products will be called the Simplex hereafter. A new factory is in operation, and the capital recently was increased by $500,000.

Motor Wheel Corp. has declared a 50 per cent stock and a 2½ per cent cash dividend, the first payable June 1 to stock of record May 15, the second payable May 20 to stock of record May 10.

The Nash Sales Co. has increased its capital from $500,000 to $1,000,000. The additional capital will be used to build up a dealer organization which will provide service for owners of Nash cars.

Erie Tire & Rubber Co.—Stockholders will meet May 12 on proposal to increase capital from $4,000,000 to $10,-000,000. Will take over Dauch Mfg. Co. and expand facilities.

General Motors Corp.—Temporary certificates for $1,408,000 7 per cent cumulative debenture stock and 744,552 shares of common listed on New York Stock Exchange.

International Motor Truck Corp. stockholders have ratified the plan to increase the capitalization to 320,000 shares of no par value and the stated capital to $17,869,700.

Pierce-Arrow Motor Car Co. reports earnings of $717,265 in the first quarter of 1920, equivalent after preferred dividends to $2.07 a share earned on the 250,000 shares of common stock outstanding.

Allen Motor Co., Bucyrus, Ohio.—Stockholders meeting called for May 11 to vote on increasing capitalization by $700,000. Reorganization of company proposed.

Marathon Motors Export Co. has incorporated at Elkhart, Ind., with a capital of $500,000. Directors, Scott H. Penfield, William H. Collier and Martin E. Crow.

International Motor Truck Corp.—Temporary certificates for 70,777 shares of common stock without nominal or par value listed on New York Stock Exchange.

East Palestine Rubber Co.—Property and assets will be transferred to Beaver Rubber Co., recently incorporated in Delaware. Company will be reorganized.

American Axle Co., Chicago, has broken ground for a new machine shop at Barton, Wis., which will cost, with equipment, $100,000.

Eisemann Magneto Corp. reports net sales of $1,093,123 and net earnings of $167,873 for the quarter ended March 31, 1920.

Parker Cord Fabric Mills, Inc., has qualified to do business in Indiana. The capital stock of the company is $2,000,-000.

Nash Motors Co. has declared a quarterly dividend of $1.75 on preferred, payable May 1, to stockholders April 20.

Studebaker Corp.—Additional common stock totalling $15,000,000 listed on New York Stock Exchange.

Duesenberg Motor Distributing Corp., New York, has been incorporated with a capital of $1,000,000.

Service Motor Truck Co., Wabash, Ind. —Capital increased from $2,000,000 to $3,000,000.

Akron Seamless Rubber Tube Co.—Capital increased from $100,000 to $250,000.

White to Increase Stock to $35,000,000

NEW YORK, May 4—A special meeting of the stockholders of the White Motor Company has been called for June 9 to authorize an increase of $10,000,000 in the capital stock. With this increase the capital would be brought up to $35,000,000. It is made clear in the notice calling the special meeting that no stock dividend is being contemplated, but that the additional stock will be offered from time to time as needs demand, to care for the company's steadily expanding business.

The annual report of the company shows a surplus after charges and Federal taxes of $2,869,875, or the equivalent of $5.83 a share of $50 par value. This compares with $2,680,585, or $8.37 a share, on the $16,000,000 capital which was outstanding at the close of 1918.

The reserve for contingencies is $1,260,000. After dividend payments the current report shows a surplus of $1,429,875.

Bank Credits

Written exclusively for AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co, second largest bank in America.*

It seems probable that for the immediate future, credit conditions will remain virtually as at present, and rates of money high. The railroad situation is still an important influence in the credit situation, especially in the West, car shortages and other difficulties seriously impeding the movement of goods and, therefore, liquidation.

Demands are still great and are reflected in bill holdings by the Federal Reserve System of $2,942,000,000, the highest figure ever established except on Feb. 27, when the system held $2,985,-000,000. Deposits, other than those of the United States Government, are at the highest point since Jan. 16, 1920. The New York Federal Reserve Bank last Friday was lending $85,000,000 to other Reserve Banks and in consequence of these continued loans and of exports, lost $48,000,000 in gold during the week. One by one Western Reserve Banks are either eliminating or reducing to a minimum the differential discount rate in favor of paper secured by Liberty bonds or Victory notes, showing the efforts they are making to force a more liquid credit condition in the interior.

CHRISTENSEN IN NEW PLANT

MILWAUKEE, May 3—The Christensen Engineering Co., Milwaukee, on May 1 moved into its new plant at Eighteenth Street and Fond du Lac Avenue, where it will engage in a daily production of fifty Christensen air-starters. The device is generally used on fire apparatus and other heavy-duty motor vehicles with large engines, and during the war many ships of the American and Allied army and navy aircraft divisions were thus equipped. It is one of the notable inventions of pneumatic type mechanical appliances by Nels A. Christensen of Milwaukee, a pioneer in the airbrake field, who is president and chief engineer of the Milwaukee concern.

MAKES NEW GASOLINE TANK

HARTFORD, WIS., May 3—The International Steel Products Co. of Hartford, Wis., which heretofore has devoted its output to silencers or mufflers for passenger cars and motor truck engines, is putting into production a pressed steel gasoline tank. The demand for mufflers is the heaviest in the history of the company.

Men of the Industry

G. R. Ashworth, assistant sales manager of the Automotive Products Co. of Detroit, has left that organization to go to Utica, N. Y., as representative of the Nash Motors Co. He has organized the Nash-Utica Motors Co. in connection with D. F. Wilson.

Arthur W. Berresford, vice-president and general manager of the Cutler-Hammer Mfg. Co., Milwaukee, has been nominated without opposition for president of the American Institute of Electrical Engineers to succeed Calvert Townley.

Charles W. Doane has been appointed Detroit representative of the automobile equipment department of the Westinghouse Electric & Mfg. Co. to succeed L. B. Fijux, who has been named vice-president of the Turner Moore Co. Doane has been succeeded by A. G. Junker.

Forrest E. Wilson has been placed in charge of a naturalization bureau organized as a labor department by the Miller Rubber Co. at Akron, Ohio, for the purpose of teaching English to factory employees. Leo Zimmerman and Mrs. Louise F. Copp are assisting him.

F. M. Bennett has been placed in charge of the Lansing office of the Garlock Sales Co., succeeding J. N. Gallagher. Bennett for several years has been chief traveling auditor of the L. E. & W. railway.

Fred G. Kimmel, vice-president in charge of engineering, and E. F. Davison, treasurer of the Rochester Motors Corp., have resigned. W. G. Hoffman, Jr., has been named treasurer, and Gordon Grand, vice-president.

John H. Mills, dean of the sales organization of the Hilo Varnish Corp., has been elected vice-president of the company. He is familiarly known in the trade as "Varnish" Mills and has been with the company 36 years.

George T. Treviranus, sales manager of the Gemco Mfg. Co., has been selected as one of five Milwaukee business men to represent the city at the seventh National Foreign Trade Convention at San Francisco.

G. A. Ungar has been appointed general Flexite sales agent and consulting engineer of the Flexite division of Slocum, Avram & Slocum, Newark. His headquarters will be in the Woolworth Building, New York.

A. F. Wilkins, assistant purchasing agent of the Republic Truck Co., has resigned to become purchasing agent for Wisconsin Motors at Milwaukee. H. J. Bunn, who has been in charge of tractor purchases at Republic, succeeds him.

P. B. Williams, general sales manager of the Mac-Lar Battery Co., has resigned to become president of the Barco Battery Co., manufacturers of the Bearcat storage battery for automobile starting and lighting.

L. W. Haig has been appointed district sales manager of the Packard Electric Co. at Buffalo. Haig is a graduate of Purdue University and has been connected with several electrical concerns.

Dwight T. Hersey has assumed the office of sales manager of the Jenkins Vulcan Spring Co., Richmond, Ind. He was formerly with the Splitdorf Electrical Co., Newark.

W. F. McLaughlin has resigned as general superintendent of the Hyatt Roller Bearing Division to take the position of works manager for the Ace Motor Corp., Philadelphia.

John Ryan has been named factory manager of the Lang Body Co., Cleveland. He was formerly with the Rauch & Lang Carriage Co. and Peerless Motor Car Co.

E. B. Thompson, former special representative of the Michelin Tire Co., has been placed in charge of the central Illinois territory for the Globe Rubber Tire Mfg. Co.

W. J. Baumgartner, chief engineer and general superintendent of the Duplex Engine Governor Co., Brooklyn, has resigned to take effect June 1.

W. P. Blanchard of Willys-Overland, Ltd., at Toronto, has joined the Studebaker organization in Detroit in the purchasing department.

A. G. Norris has been appointed district manager of the S. K. F. Industries, Inc., for western New England with headquarters at New Haven.

George A. Shoemaker has been appointed works manager of the Bound Brook Oil-less Bearing Co., Bound Brook, N. J.

A. L. Bennett has become associated with Robert P. Marshall & Co., stock brokers, at the Columbus Circle branch.

G. J. Eyler has been named sales promotion manager of the Service Motor Truck Co.

Charles F. Herb has been elected vice-president in charge of finances of the Sinclair Motors Corp.

John Laurence has been appointed Chicago representative for Alfred Herbert, Ltd., New York.

Arthur Kirkland has assumed charge of the Cleveland office of Russell, Holbrook & Henderson, Inc.

Accessory Association Opposes Metric System

NEW YORK, May 5—Basing its action upon a referendum taken among its membership of 350 representative manufacturers of automobile parts and equipment, the executive committee of the Motor and Accessory Manufacturers Association has adopted resolutions opposing the introduction of the metric system into American industry.

It is pointed out in the resolutions that the advantages of the metric system are not offset by the disadvantages and that the benefits would not justify the enormous expense which would be entailed through the necessary changes in sizes of product and equipment. These changes would mean excessive loss through destruction of present equipment not adapted to the new system.

The executive committee commends the work being done by the American Institute of Weights and Measures in opposing the metric system.

Maxwell-Chalmers Merger Is Continued

NEW YORK, May 5—Final action on the merger of the Maxwell and Chalmers interests has been continued over until August 1, it was announced at the offices of J. S. Bache & Co., to-day. Postponement is due to delay in completing details of consolidation. The committee having the merger in charge comprises Jules S. Bache, J. Horace Harding, and Hugh Chalmers, representing the Chalmers company, and James C. Brady, John R. Morron, and Elton Parks, representing Maxwell.

BOREN MIAMI OFFICIAL

MIDDLETOWN, O., April 30—Edgar Boren, for years head of the bicycle and accessory department of the Simmons Hardware Co., has been elected vice-president and assistant general manager of the Miami Cycle and Mfg. Co. He became associated with bicycles as a racer in his home town of Dallas when a boy and made several records on the Stearns "Yellow Flyer." Later he opened a bicycle store in Dallas, which he conducted for nine years, and in 1900 went with the Simmons Co., covering Texas as a salesman for sixteen years.

M'INNES OPENS OFFICES

NEW YORK, May 4—The following branch offices have been located by McInnes Steel Co., Ltd., manufacturers of crucible tool steels:

Detroit, John D. Scott, manager; Chicago, Arthur E. Duclos; Philadelphia, John A. O'Donnell; New York, R. S. Hill; Cincinnati, Paul E. Noel; East Cleveland, G. W. Radcliffe.

BERGMANN CHANGES POSITION

NEW YORK, May 3—A. C. Bergmann is new general sales manager of the Sterling Motor Truck Co. of New York, with headquarters at 132nd Street and Twelfth Avenue. For the past five years he was New York branch manager of Standard Parts Co., beginning with service work.

TAKE COAST SHOW SPACE

SAN FRANCISCO, May 3—Officials in charge of the recent automotive equipment exposition here report more than 60 per cent of the exhibitors already signed for space at a similar show to be given next year. In addition to these many firms who were unable to secure accommodation in this year's show have applications in for space in the next.

Calendar

May 17-22 — Ship-by-Truck — Good Roads Week — May 17-22

SHOWS

Oct. 6-16—New York. Electrical Show. Grand Central Palace. George F. Parker, Manager.

Dec. 10-18—New York. Motor Boat Show. Grand Central Palace.

FOREIGN SHOWS

May 15-June 13 — Cars, Parts and Accessories. Antwerp.

June 21-27—Sunsvall, Sweden. Automobile Exhibition. Norrland Fair.

June 26-July 25 — Commercial vehicles, tractors, camions and engines. Antwerp.

July 9-20—London, England. International Aircraft Exhibition. Olympia. The Society of British Aircraft Constructors.

Aug. 7-Sept. 15 — Motorcycles, sidecars, etc. Antwerp.

October—London. Commercial Vehicle Show, Olympia.

November—London. Passenger Car Show, Olympia.

CONTESTS

May 17-27—Boise Truck Run, Salt Lake City to Boise. Intermountain Automotive Dealers Association.

May 31 — Indianapolis, Ind. Speedway.

May 31—Brockport, N. Y. Dirt track.

June 1—Omaha, Neb. Truck Reliability Run.

June 12—Uniontown, Pa. Speedway.

June 17—Portland, Ore. Dirt track.

June 17-18—Chicago, Inter-Club Run, Chicago Automobile Club.

June 19—Ogdensburg, N. Y. Dirt track.

July 4—Tacoma, Wash. Speedway.

July 4—Hanford, Cal. Dirt track.

July 4—Spokane, Wash. Dirt track.

July 5—Batavia, N. Y. Dirt track.

July 17 — Warren, Pa. Dirt track.

July 24—Watertown, N. Y. Dirt track.

July 31—Fulton, N. Y. Dirt track.

Aug. 7—Erie, Pa. Dirt track.

Aug. 14—Buffalo, N. Y. Dirt track.

Aug. 20-21—Middletown, N. Y. Dirt track.

Aug. 21—Johnstown City, Pa. Dirt track.

Aug. 21—Elgin, Ill. Road race, Chicago Automobile Club.

Aug. 28—Canandaigua, N. Y. Dirt track.

Aug. 27-8—Flemington, N. J. Dirt track.

August, 1920—Paris, France. Grand Prix Race. Sporting Commission Automobile Club of France.

Sept. 1—Glidden Tour—N. Y. to San Francisco.

Sept. 5 — Targa Florio Race, Sicily.

Sept. 6—Hornell, N. Y. Dirt track.

Sept. 6—Cincinnati, O. Speedway.

Sept. 6—Uniontown, Pa. Speedway.

Sept. 17-18—Syracuse, N. Y. Dirt track.

Sept. 25—Allentown, Pa. Dirt track.

Oct. 1-2—Trenton, N. J. Dirt track.

Oct. 8-9—Danbury, Conn. Dirt track.

CONVENTIONS

May 9-12—Independent American Petroleum Congress, Congress Hotel, Chicago.

May 12-15, 1920—San Francisco. Seventh National Foreign Trade Convention.

May 20-30—Atlantic City. Third American Aeronautic Congress, Aero Club of America.

May 24-26—Indianapolis, Service Managers' Convention. National Automobile Chamber Commerce, Service Division.

June 7-10 — Indianapolis, Ind. Annual Convention of the Associated Advertising Clubs.

June 7-11 — Del Monte, Cal. Automotive Equipment Association, Directors' Meeting, 7-8; General Sessions 10-11.

June 22-25—Asbury Park, N. J. Annual meeting American Society for Testing Materials.

S. A. E. MEETINGS

June 21-25 — Ottawa Beach, Mich. Summer Conference.

Many Truck Tours Scheduled for Year

WASHINGTON, May 3—In addition to over 100 tours of motor trucks out into the rural districts during "National Ship-by-Truck and Good Roads Week" which has been sanctioned by organizations with foresight as to the value of the motor truck, there are many other tours scheduled for 1920 for motor trucks.

In the Middle West plans are under way for a truck tour through Nebraska, Kansas, Colorado, Wyoming, Iowa and South Dakota, which takes in a rich farming country. This tour under the auspices of an Omaha newspaper has awakened great interest among the farmers who in that section are large purchasers of motor trucks.

At Salt Lake City the dealers are planning on a truck tour that will go north to Boise. Out of Detroit, W. D. Edenburn, in charge of the Michigan Pikes Tour, which will go from Detroit to Toronto, and then return via the Upper Michigan Peninsula route, will use trucks which are to be put to novel work.

Factories are designing bodies for the trucks that will go on this tour that will be an innovation in cross-country traveling. It is possible that as a result of Mr. Edenburn's work, the American Automobile Association may find it convenient to have a truck train on the Glidden tour carrying a regular kitchen where mess can be prepared, camping paraphernalia transported and a repair outfit carried for cars that may meet with accidents.

National Ship-by-Truck and Good Roads Week, May 17-22, inclusive, will have the active co-operation of the National Automobile Chamber of Commerce, National Automobile Dealers Association, Motor Accessory Manufacturers' Association, American Automobile Association, National Association of Motor Truck Sales Managers, Trailer Manufacturers' Association, Chamber of Commerce of the United States, the Manufacturers' Association, Advertising Clubs of the World, the National Grange, the United States Army Recruiting Service and the United States Senate through Senator Townsend.

Motor Transport Tour Awaits Authorization

WASHINGTON, May 3—Plans for the transcontinental tour of 30 trucks operated by the Motor Transport Corps are now before the chief of staff, United States Army, for his approval. It is expected that authorization for the trip will be given this week and the itinerary finally determined.

It is quite certain that the trip will be made from the Bankhead Highway to the Pacific Coast. The company will be at full war strength and will take about two months in crossing the continent. The roads in many of the states are in bad condition, according to reports received here. The maps show that in many places it will be necessary for these heavy trucks to use trails. It is under such conditions that the supreme tests will be made.

PERFECTS GASOLINE MACHINE

KENOSHA, WIS., May 3—Dr. George L. Ross of Kenosha, Wis., has perfected a new type of coin-controlled gasoline and oil-dispensing machine which is now being given thorough tests in practice at Kenosha. Dr. Ross is negotiating with the Coin Controlled Lock Co. of Indianapolis for quantity production.

Engineers Arrange Convention Program

ST. LOUIS, April 30—Subjects for discussion at the annual meeting of the American Society of Mechanical Engineers which will be held at the Hotel Statler in this city May 24-27 will include housing, aeronautics, river transportation, foundry practice dealing with castings of all kinds, alloys, power and transmission and screw threads.

Papers on the housing problem will be read by Nelson Cunliff of St. Louis and Leslie H. Allen of Springfield, Mass., who will consider it from the industrial viewpoint.

The program for the aeronautic and foundry practice sessions, which will be held the morning of May 26, follows:

AERONAUTIC SESSION: "Physical Basis of Propeller Design," F. W. Caldwell and E. N. Fales; "Analytical Theory of Airplanes in Rectilinear Flight and Calculation of Maximum Cruising Radius," A. Rateau, Hon. Mem. Am. Soc. M. E.; "Aeronautic Instruments—General Principles of Construction," Mayo D. Hersey; "Flow of Air Through Small Tubes," T. S. Taylor.

FOUNDRY PRACTICE SESSION: "Gray Iron Castings," Richard Moldenke; "Malleable Castings," Enrique Touceda; "Steel Castings," John H. Hall; "Aluminum Castings," Zay Jeffries; "Die Castings," Charles Pack.

WETMORE REAMER BUILDS

MILWAUKEE, May 3—The Wetmore Reamer Co., manufacturer of reaming and other metalworking tools, has broken ground for a complete new manufacturing plant on Twenty-seventh Street, between Clybourn Street and St. Paul Avenue. It will be 75 x 175 ft., and with equipment will cost about $100,000.